MISSILE AND SPACE ACTIVITIES

UNIVERSITY OF MICHIGAN
MAR 1 9 1959
MAIN READING ROOM

JOINT HEARINGS

BEFORE THE

PREPAREDNESS INVESTIGATING SUBCOMMITTEE OF THE COMMITTEE ON ARMED SERVICES

AND THE

COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES

UNITED STATES SENATE

EIGHTY-SIXTH CONGRESS

FIRST SESSION

ON

MISSILE AND SPACE ACTIVITIES

JANUARY 29 AND 30, 1959

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MISSILE AND SPACE ACTIVITIES

THURSDAY, JANUARY 29, 1959

U.S. SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE
OF THE COMMITTEE ON ARMED SERVICES,
AND THE COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES,
Washington, D.C.

The subcommittee (composed of Senators Johnson of Texas (chairman), Stennis, Symington, Bartlett, Bridges, Saltonstall, and Mrs. Smith) met, pursuant to call, at 10:08 a. m., in the caucus room, room 318, Senate Office Building, Senator Lyndon B. Johnson (chairman of the subcommittee) presiding.

Present: Senators Johnson of Texas, Stennis, Symington, Bartlett, Saltonstall, and Mrs. Smith.

Also present and participating:

Members of the Committee on Aeronautical and Space Sciences: Senators Anderson, Young of Ohio, Dodd, Cannon, Wiley, Martin, and Case of New Jersey.

Also present: Senator Case of South Dakota, Senator Bush, and Senator Dirksen.

Staff members, Preparedness Investigation Subcommittee: Edwin L. Weisl, special counsel; Cyrus R. Vance, associate counsel; Solis Horwitz, associate counsel, Daniel F. McGillicuddy, associate counsel; Stuart French, associate counsel; Edwin L. Weisl, Jr., assistant special counsel, and Dr. Edward C. Welsh, assistant to Senator Symington.

Staff members, Committee on Aeronautical and Space Sciences: Kenneth E. BeLieu, staff director; Max Lehrer, assistant staff director; Everard H. Smith, Jr., counsel; Dr. Glen P. Wilson, chief clerk, and Mrs. Eilene Galloway, special consultant.

Senator JOHNSON. The committee will come to order.

This is a meeting of the Preparedness Investigating Subcommittee of the Armed Services Committee. We have, because of the nature of the testimony, invited the members of the Space Committee to sit in with us.

We are delighted also to have with us the distinguished minority leader, Mr. Dirksen.

Mr. Secretary, members of the committee, we are here today to try to get an accounting—plain, unvarnished and unadorned—of what has happened to the Nation's preparedness program.

A year ago, this committee completed a series of hearings into the American satellite and missile programs. The conclusions, reached unanimously by this group, were not reassuring.

We found:

1. The Soviet Union was ahead of the United States in the development of ballistic missiles.

2. The Soviet Union had more submarines than the United States.

3. The Soviet Union was closing the gap in manned air power and, at the then-existing rate, would surpass this country in a comparatively short time.

Our hearings then, as now, were held for constructive, rather than critical, purposes. We not only reached conclusions, we also set forth recommendations—17 of them.

We are here today to review the progress that has been made since those recommendations were made—again, unanimously—by our committee.

EXPLORATION INTO STATE OF OUR PREPAREDNESS POSTURE

I know that I can speak for the members of this committee when I say that we are not interested in defense as an "issue." We want to know where we stand, and this is a question to which there should be a clear-cut answer.

We are not concerned with rosy optimism or with finding fault or scapegoats. We want the facts—with the bark off, please.

As I have indicated, the committee has two primary interests:

First. Is the United States doing everything it reasonably can and should do to insure the defense of this country and the free world against military aggression?

Second. Is the United States doing everything it reasonably can and should do in the exploration of outer space?

The hearings scheduled for today and tomorrow are to be open. Obviously, as time progresses we shall have to hold classified sessions.

We have also requested the witnesses who are scheduled for today and tomorrow to dispense with lengthy prepared statements. All of them are qualified to get right down to cases in areas of their own responsibility.

Secretary McElroy and General Twining, we are very happy to have both of you with us today. We know that it is your desire, as it is ours, to present the facts.

Our distinguished and able counsel, Mr. Weisl, and his assistant, Cy Vance, will ask the initial questions of each witness. We will then call upon Senators in accordance with established procedures of the committee and give each Senator a question period of 5 minutes on the first go-around, and then we will have an additional go-around, if it is necessary.

STATEMENT OF HON. NEIL H. McELROY, SECRETARY OF DEFENSE, ACCOMPANIED BY GEN. NATHAN F. TWINING, CHAIRMAN, JOINT CHIEFS OF STAFF

(The biographies of Mr. McElroy and General Twining are as follows:)

NEIL HOSLER MCELROY, SECRETARY OF DEFENSE

Neil H. McElroy was nominated to be Secretary of Defense by the President on August 7, 1957. His nomination was confirmed by the Senate on August 19, 1957, and he was sworn into office on October 9, 1957.

Mr. McElroy was born in Berea, Ohio, on October 30, 1904, the son of Malcolm Ross and Susan Harriet (Hosler) McElroy, both one-time school teachers. Moving to Madisonville, Ohio with his family at an early age he has lived most of his life in the Cincinnati, Ohio area. He attended Cincinnati's East High School (now Withrow High School) and upon graduation won a scholarship to Harvard University. At Harvard he majored in economics earning a Bachelor of Arts degree, played in the college band, and was a member of the basketball team. He was president of Harvard's Sigma Alpha Epsilon Fraternity chapter.

Immediately upon graduation from Harvard in 1925 he went to work in the advertising department of Proctor & Gamble Co. of Cincinnati, and in 1929 became manager of the promotion department. He has remained with P. & G. for 32 years, serving successively as manager of the advertising and promotion department (1940–43); director and vice president in charge of advertising (1943–46); vice president and general manager (1946–48); president (1948–57). During 1955, Mr. McElroy devoted considerable time and effort to his responsibilities as Chairman of the White House Conference on Education.

At the time of his nomination as Defense Secretary, Mr. McElroy was a director of General Electric Co. and Chrysler Corp. His membership in civic organizations included member, advisory board, National Citizens' Council for Better Schools; member executive committee and director, Citizens' Development Committee; member, executive committee, Cincinnati Summer Opera; trustee, National Industrial Conference Board; trustee, Cincinnati Institute of Fine Arts; trustee, National Fund for Medical Education; member, advisory committee of the College of Medicine, University of Cincinnati; member of Committee on University Resources, Harvard University, and membership in other organizations. On becoming Secretary of Defense, he resigned from all of these activities.

He is a member of the following clubs: Cincinnati Country, Harvard, Commonwealth, Commercial, Camargo, Optimist, and Queen City in Cincinnati; Metropolitan and Links in New York City.

Married in 1929 to the former Mary Camilla Fry of Terrace Park, Ohio, whom he has known since high school days, he is the father of three children; two daughters, Nancy Sue and Barbara Ellen (now Mrs. David Dimling), and a son, Malcolm Neil, 16.

Mr. and Mrs. McElroy have retained their residence at 3478 Vista Terrace, Cincinnati, Ohio, and make their Washington home at the Sheraton Park Hotel.

GEN. NATHAN F. TWINING, USAF, CHAIRMAN, JOINT CHIEFS OF STAFF

Nathan Farragut Twining was born in Monroe, Wis., on October 11, 1897. He began his active service in June 1916 with Company H of the Third Oregon Infantry (National Guard) and served as a corporal on Mexican border duty until September of that year. In March 1917, he was recalled to active duty as a sergeant in the same organization and was promoted to first sergeant the following month. In May 1917, he received an appointment through the Oregon National Guard and entered the U.S. Military Academy. He graduated in November 1918 as a second lieutenant of Infantry and remained assigned to the Academy as an officer cadet until June 1919.

In July 1919 he joined the American forces in Germany as a military ground observer and toured Belgian, French, and Italian battlefields. He entered the Infantry School at Fort Benning, Ga., in September 1919, graduated the following June, and was assigned to the 29th Infantry Regiment at Fort Benning. In February 1922, he was assigned as aide to Brig. Gen. B. A. Poore and served with him at Camp Travis, Tex.; Fort Logan, Colo.; and Fort Sam Houston, Tex.

His air training began in August 1923, when he entered primary flying school at Brooks Field, Tex. He graduated from advanced flying school at Kelly Field, Tex., in September 1924, and then returned to Brooks Field as an instructor. On November 16, 1926, he was transferred to the Air Service and the following September he was reassigned to March Field, Calif., where he served as a flying instructor. In February 1929 he joined the 18th Pursuit Group at Schofield Barracks, T.H., where he served successively as adjutant, personnel officer, headquarters detachment commander, and commanding officer of the 26th Attack Squadron.

General Twining was ordered to Fort Crockett, Tex., in March 1932, and was assigned to the Third Attack Group as a squadron commander; that August he joined the 90th Attack Squadron and a month later, the 60th Service Squadron at the same base. He became engineering officer for the Central Zone (U.S. Army Air Mail Service) in Chicago, Ill., in February 1934, and then returned to Fort Crockett in June, where he became adjutant to the Third Attack Group. In addition to other duties, he coached the post football team for 2 years at Fort Crocket. In March 1935, he became assistant operations officer of the Third Wing at Barksdale Field, La. That August he entered the Air Corps Tactical School at Maxwell Field, Ala., and completed the course a year later. In August 1936 he entered the Command and General Staff College at Fort Leavenworth, Kans., and graduated the following June.

He was named air corps technical supervisor at San Antonio Air Depot, Duncan Field, Tex., in July 1937. In August 1940, he was reassigned to the office of the Chief of the Air Corps in Washington, D.C. as assistant chief of the Inspection Division. Three months later he became chief of the technical inspection section in the same office. He joined the operations division in December 1941, was named assistant executive in the Office of Chief of Air Corps in February 1942, and 3 months later was appointed Director of War Organization and Movements in that office.

General Twining was sent to the South Pacific as Chief of Staff to Maj. Gen. M. F. Harmon, Commanding General of the U.S. Army Forces in the South Pacific Area in July 1942 and was named Commanding General of the 13th Air Force the following January. On July 25, 1943, he was appointed Commander, Aircraft, Solomon Islands and placed in tactical control of all Army, Navy, Marine, and Allied Air Forces in the South Pacific, one of the first Joint Air Commands in U.S. history.

He assumed command of the 15th Air Force in Italy in November of 1943 and 2 months later, in addition to his other duties, became Commander of the Mediterranean Allied Strategic Air Forces. On August 2, 1945, he was appointed Commander of the 20th Air Force in the Pacific; a few days later, his command dropped the first atomic bomb at Hiroshima. He retained this command until the end of the war.

In October 1945, General Twining moved to Continental Air Force Headquarters at Bolling Field, Washington, D.C.; 2 months later he was appointed Commanding General of the Air Materiel Command at Wright Field, Ohio. He remained there until October 1, 1947, when he became Commanding General of the Alaskan Department; 3 weeks later he was Commander in Chief of the Alaskan Command at Fort Richardson.

He returned to Washington in July 1950 as Deputy Chief of Staff for Personnel, which position he held until October 10, 1950, when he was appointed Vice Chief of Staff of the Air Force. He was named Chief of Staff of the Air Force on June 30, 1953.

On March 26, 1957, President Eisenhower nominated General Twining to succeed Admiral Radford as Chairman of the Joint Chiefs of Staff, effective on August 15, 1957. The nomination was approved and from July 1 to August 15 he served as Special Assistant to Secretary of Defense Charles E. Wilson. On August 15, 1957, General Twining was formally sworn in as Chairman of the Joint Chiefs of Staff by President Eisenhower in the Cabinet Room of the White House.

His decorations include the Distinguished Service Medal with Oak Leaf Cluster, Navy Distinguished Service Medal, Legion of Merit with one Oak Leaf Cluster, Distinguished Flying Cross, Bronze Star Medal, Air Medal with one Oak Leaf Cluster, Commendation Ribbon, Victory Medal (World Wars I and II), Army of Occupation Medal (World War I), American Defense Medal, Asiatic-Pacific Campaign Medal with four battle stars, European-African-Middle Eastern Campaign Medal with seven battle stars, American Theater Campaign Medal, Knight of the British Empire, Legion of Honor in the Grade of Commander, Croix de Guerre with two Palms from France, Polish Medal of Merit with Swords, Greek Order of the Sphinx, Peruvian Aviation Cross (1st Class), White Elephant from Thailand, Egyptian Medal of Merit, Korean Medal, and Military Order of Italy.

General Twining and his wife, the former Maude McKeever of Oahu, T.H., have three children, Richard G., Nathan A., and Olivia T. Hansell.

Senator JOHNSON. Mr. Secretary, we are delighted to have you with us.

Mr. Weisl, will you proceed with the examination?

Mr. WEISL. Mr. Secretary, so much has been written and talked about on the subject of operational intercontinental ballistic missiles, and so little has been stated about actual facts, that I would like to ask you some factual questions about an operational intercontinental ballistic missile.

General Schreiver testified in the previous hearings that in order to have an ICBM in operation, four elements were necessary:

1. You had to have the missile.
2. You had to have training crews to operate the missile.
3. You had to have bases from which to launch the missiles, and
4. You had to have logistics to support the base.

Do you agree with those facts?

Secretary MCELROY. I do, Mr. Weisl.

I would like, Mr. Chairman, and members of the committee, inasmuch as you would prefer not to hear a formal statement of position, that the Secretary either be permitted to read an initial statement, which is about 3 minutes' duration, or simply file it for the record, if you would prefer.

Senator JOHNSON. Fine, Mr. Secretary, if you have a statement you care to read, we will be glad to hear it.

Secretary MCELROY. I think it may put this in a proper context and delay the proceedings only briefly.

Senator JOHNSON. Fine. We wanted to ask questions, and I thought the staff had worked that out and it was agreeable to you.

Secretary MCELROY. I am quite willing simply to put it in the record, if you would prefer, but it would take about 3 minutes, if you would like to hear it.

Senator JOHNSON. We would like to hear it.

Secretary MCELROY. Mr. Chairman, and committee members:

I recognize you are trying to cover a great deal of ground in a short time. I do not want to make inroads on that short time with a long statement. However, since General Twining and I are here primarily to consider with you the Nation's state of preparedness, I believe it proper that I give you a brief statement on the question of whether this country is prepared to meet the requirements that may be placed on it to protect its security and its independence.

We have expressed ourselves in the past on this point and we feel we should do so again, although obviously the subject will be given a great deal more examination in the course of the hearings this morning.

SECRETARY ASSERTS BUDGET MEETS REQUIREMENT FOR PROTECTING SECURITY

I can say to you that the fiscal 1960 budget, which reflects the most recent review of the Nation's defense requirements, has been prepared with the obligation of protecting this Nation's security as our number one consideration. It is our belief that it meets this requirement.

This country must be in a position of sufficient retaliatory strength to deter a potential enemy from launching general war. We must be prepared to handle limited war situations effectively, so that our

obvious readiness will deter such wars or keep them small and handle them quickly. We have need of maintaining the defenses of this country. We must keep open the sealanes which are essential to the maintaining of our commitments with allies throughout the world. All these needs have been carefully considered.

It is my belief that the program provided in the new budget meets these needs adequately. This is not only my belief, it is also the view of the President. Moreover, it is shared by the Joint Chiefs of Staff, who have said to me in writing that they consider that the fiscal year 1960 proposed expenditure figure is adequate to provide for the essential programs necessary for the defense of the Nation for the period under consideration. The Chiefs state that they find no serious gaps in the key elements of the budget in its present form. While expressing these views as to the adequacy of the overall programs, each Chief does of course express some reservations regarding some of the program items of his own service.

General Twining and I shall be glad to answer your questions and are pleased to go right ahead with the first one that has been placed to us by Mr. Weisl.

Senator JOHNSON. Do you have any other statements you care to make?

Secretary MCELROY. No, sir.

Senator JOHNSON. General Twining, do you care to make a statement?

General TWINING. I have no statement, Mr. Chairman; no statement.

Senator JOHNSON. Proceed, Mr. Weisl.

Mr. WEISL. In connection with these four elements necessary to have an operational ICBM, may I ask how many training crews we now have ready to operate an ICBM?

Secretary MCELROY. I would believe, Mr. Weisl—and this is something that I couldn't answer specifically; it could be answered only by the Air Force, without confirmation—I believe there would be one in the process of training. We have one operational base which will be ready in June of this year, and for that reason I would assume that the training that is going on, because everything is in consonance with the timing of the delivery of the missiles, the training would be going on in relationship to the availability of that base in June.

Mr. WEISL. How long does it take to train a crew?

Secretary MCELROY. I don't know that either, Mr. Weisl.

CREWS WILL BE READY TO OPERATE MISSILES

Mr. WEISL. How many bases do we now have that are available for launching an ICBM?

Secretary MCELROY. We will have ready, when the missiles are ready to place on Cooke Air Force Base,[1] we will have one base ready in June of this year to receive these missiles, and we will have operational crews to operate these first missiles.

Mr. WEISL. How close to the seacoast is this base?

Secretary MCELROY. That is quite close to the seacoast.

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[1] Now Vandenberg Air Force Base.

Mr. WEISL. How many other bases are in process of construction?

Secretary MCELROY. We have, Mr. Weisl, three bases which are designated for the Atlas; we have one which is designated to Titan, and they are in various stages of preparation.

Mr. WEISL. How long will it take to complete those bases?

Secretary MCELROY. They will be completed in consonance with the delivery of our missiles under our program.

Mr. WEISL. What is your program?

Secretary MCELROY. The program is classified, Mr. Weisl.

Mr. WEISL. The testimony, the sworn testimony of General Schreiver in open session in our last hearings, was that it would take between 2½ and 3 years to train the crews, to build a base, and to support the logistics necessary to put the base in operation.

Do you agree with that testimony?

Secretary MCELROY. My testimony is that when the missiles are ready, we will have crews and bases ready to fire these.

Mr. WEISL. I asked about General Schreiver's testimony.

Secretary MCELROY. I don't know General Schreiver's testimony; I wasn't here.

Mr. WEISL. Well, General Schreiver will be here, and I believe he will so testify.

Secretary MCELROY. I think he will also testify to the rightness of what I am saying, that the crews and the bases will be ready when the missiles are ready, because the entire program is moving in accord with the delivery of the missile for placing on bases.

Mr. WEISL. I believe you stated that the first operational squadron of ICBM's will be ready in July of this year.

Secretary MCELROY. Yes, sir.[2]

Mr. WEISL. And those will be at Camp Cooke?

Secretary MCELROY. That is correct, sir.

Mr. WEISL. And Camp Cooke is on the seacoast, is it not?

Secretary MCELROY. Yes, sir.

Mr. WEISL. Will this be a soft base, or a hard base?

Secretary MCELROY. It will be a soft base.

SOFT BASE COULD BE DESTROYED BY CONVENTIONAL WEAPONS

Mr. WEISL. Can a soft base be destroyed by a conventional weapon, such as dynamite?

Secretary MCELROY. Yes.

Mr. WEISL. Can a soft base be destroyed by a missile launched from a submarine within 50 miles of the coast?

Secretary MCELROY. Fifty miles, 10 miles.

Mr. WEISL. In determining the retaliatory strength of an ICBM, the nation that has the initiative has a great advantage, has it not?

Secretary MCELROY. Yes.

Mr. WEISL. And it must be assumed that if such a nation launches a surprise attack, it will knock out some of our retaliatory capacity?

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[2] The following correction was submitted by Secretary McElroy:

"The Secretary had said previously, 'We have one operational base which will be ready in June of this year' and in a second instance 'We will have one base ready in June of this year to receive those missiles.' The question here asked substituted the word 'squadron' for the Secretary's word 'base' and in the give and take of the questioning this went unnoticed by the Secretary. If the question is revised to reflect an accurate quotation of what the Secretary had said, the Secretary's answer is correct. Otherwise, the following change should be made in the response: 'No, sir. I said "base", not "squadron."'"

Secretary McElroy. I would assume that that would be true, although, of course, the way in which we are organizing our forces, dispersing our forces, protecting our forces in a variety of ways, is planned to minimize that.

This is a disadvantage which we undertake in this country because of our unwillingness to take the initial step in starting a general nuclear war.

Mr. Weisl. Well, in determining the strength of our retaliatory capacity, we must assume that some of that capacity will be destroyed by the nation that attacks.

Secretary McElroy. That is assumed.

Mr. Weisl. Must we not also assume that such a nation is willing to take a certain amount of retaliatory attack?

Secretary McElroy. That is assumed.

Mr. Weisl. Isn't it a fact that Russia did take the loss of 20 million men in the last war and the destruction of several hundred of her cities, and still survive?

Secretary McElroy. She did. I don't think she thought she was going to, nor did she want to.

Mr. Weisl. But they took it.

Secretary McElroy. They took it. You take whatever you have to take once you are in war.

Mr. Weisl. Therefore, we must have assurance, assume that we have sufficient retaliatory capacity, to make it unwise for her to take a risk?

Secretary McElroy. To make it not only unwise, but unacceptable. In other words, their judgment has got to be that what we can do in the destruction of their country is of such awesome proportions that they do not want to accept that as the price which they would have to pay for attacking us.

Mr. Weisl. Therefore, in order to determine how many ICBM's we must have, we must take into account the risk that the enemy is willing to take, and the number of ICBM bases that may be destroyed in the initial attack.

RETALIATORY CAPABILITY CANNOT BE LIMITED TO ICBM

Secretary McElroy. You are putting this entirely on the ICBM, Mr. Weisl. I cannot limit our consideration of our retaliatory capacity to the ICBM, because there are so many factors in our retaliatory capacity.

Mr. Weisl. I fully appreciate that, and I will go into the other elements, but I can't go into them all at one time.

Secretary McElroy. I think I must bring this up, though, Mr. Weisl, in balancing this discussion.

Mr. Weisl. Very well.

Can you state the schedule of production and operational capacity of ICBM's over the next 2 years?

Secretary McElroy. That is classified information, Mr. Weisl. I will be glad to do it in executive session, of course.

Senator Johnson. That is satisfactory.

Mr. Weisl. Yes.

Now, in your statement—until we get an ICBM capacity or an operational capability, we must have strength in being; is that correct?

Secretary McElroy. Yes, sir.

Mr. Weisl. And the enemy will not strike until we are ready to deter him; he will strike when he thinks he can destroy us?

Secretary McElroy. He will strike if he decides he wants to strike, when he thinks he can destroy us without himself being destroyed.

Mr. Weisl. In our previous hearings in which we heard about 90 witnesses under oath, and interviewed about 250 witnesses, we discussed certain capabilities in being while we were awaiting to build up our ICBM's, our IRBM's, the Polaris, and so forth, and testimony was taken concerning the weapons that we were developing and making available during that period.

Among those weapons or weapons systems on which you and other witnesses testified were the Regulus, the Snark, and other missiles with potential range and potential destructive power.

I believe the testimony was—at least the testimony of Admiral Burke was—that the Regulus at that time was considered a topnotch high-grade deterrent weapon of immense destructive capacity.

Is that true?

Secretary McElroy. Yes, sir.

Mr. Weisl. And that we spent approximately $290 million in developing that weapon.

Secretary McElroy. I don't know the exact amount, but it would be very substantial.

Mr. Weisl. The testimony also was that that weapon last year, last January, had had 23 successful test flights.

Do you recall that testimony?

SECRETARY CALLS REGULUS VERY GOOD WEAPON

Secretary McElroy. Again, the exact figures I don't recall, but I am sure it has had many successful test flights, because it is a very good weapon.

Mr. Weisl. And the Navy testified, or the Navy personnel testified, that it could be in operation with the fleet by March of 1960, and that it could be launched from the ground, that it could be launched from a submarine, that it could be launched from a merchant ship, from an aircraft carrier, or from a cruiser.

Is that correct?

Secretary McElroy. I am sure that is true about this weapon; yes.

SUCCESS WITH POLARIS RESULTED IN TERMINATING REGULUS

Mr. Weisl. Now, this weapon has been terminated and canceled. Will you please tell the committee why such a weapon, the capability and efficiency of which were so highly recommended to this committee last July, as a weapon that would be in being while we were waiting for the Polaris, and for the ICBM, and so forth, why was that canceled?

Secretary McElroy. I will be very glad to, Mr. Weisl.

This is a case of a very successful development program on Polaris, which is considered by the Navy and by the scientific advisers of the Department of Defense as superior even to a very good weapon. The Polaris has moved forward a good deal more rapidly than we

have anticipated. We now expect to have our first Polaris submarine fully loaded, operational, in the fall of 1960, the early fall.

The overlapping, therefore, which we had thought might—or rather, the interim between the delivery of the Regulus II and the Polaris which we originally had thought might be about two years looks now to be only a few months.

Because of the very considerable superiority of the Polaris, it was determined that science had overtaken the Regulus II, and that was the reason for the cancellation of it.

It should be understood and recalled, however, in this connection, that we will have substantial—when I say "substantial"—we will have 25 Regulus I missiles available for launch from submarines, which had already been planned and set up before the cancellation of the Regulus II came along, so that we will not be lacking in the use of the Regulus I if we ever need to do so.

Mr. WEISL. Of course, all of us hope and pray that the Polaris will be ready in limited quantities by the fall of 1960. But it has not been fully tested, has it?

Secretary MCELROY. It has not been fully tested, but it has been tested to an extent that the scientific advisers that we have regarded it as a weapon system on which we can rely. And I think the Congress felt this way, because in the 1959 budget the amounts of money appropriated were substantially in excess of those requested by the President in his budget.

Mr. WEISL. In that connection, you didn't use the money that was appropriated for the acceleration of the submarine program of the Polaris.

Secretary MCELROY. We used half of it for what we regarded as an optimum acceleration of the program, research and development-wise, and that is one of the ways in which you have been able to accelerate the early development of the Polaris capability.

Mr. WEISL. But the appropriation was based upon your testimony—I don't say yours, personally, but the overall testimony of the Defense Department—that in order to accelerate as speedily as possible the Polaris program, you needed an appropriation for nine submarines, and you have only built four, or are building four, and haven't even started on the other five.

Secretary MCELROY. No; we are building five, and the—I am not suggesting to contradict you, Mr. Weisl.

Mr. WEISL. That is all right.

MONEY FOR THE THREE POLARIS SUBMARINES CARRIED OVER

Secretary MCELROY. But the facts are we did have five in the program.

The provision of the additional funds by the Congress was for four additional, making a total of nine, and we have released the money required for the accelerated research program, one additional submarine, making a total of six, and have carried over the balances of the money to finance the additional three submarines in the 1960 fiscal year.

Mr. WEISL. Now, in the original prognostication of the Defense Department, it was represented that the Polaris would be ready in 1963, and that was moved to 1962, then to 1961, and then to 1960.

Secretary McElroy. Yes, sir.

Mr. Weisl. Now, in moving the Polaris program from 1963 to the fall of 1960, you had to degrade the capability of the Polaris, did you not?

Secretary McElroy. Not sufficiently to make it a weapon unable to accomplish its mission. There has been some minor sacrifice in range.

Mr. Weisl. May I specifically direct your attention to these facts, and you may correct them if I am wrong:

The original range of the Polaris was 1,500 miles. The present range, based upon the accelerated date program, is in the neighborhood of 800 to 1,000 miles; is that not true?

Secretary McElroy. This is classified, Mr. Chairman.

Mr. Weisl. Did not the original program contemplate the building of special-type submarines?

Secretary McElroy. Oh, yes; of course.

Mr. Weisl. And this program does not contemplate special types?

Secretary McElroy. Of course, you have special types; you must have.

Mr. Weisl. As I understand it, the present program contemplates the conversion of a *Nautilus*-type submarine into a Polaris submarine, which some of the Navy men have told me, and I may be wrong and they may be wrong, is not as good as a specially built submarine for the sole purpose of launching the Polaris.

Secretary McElroy. Well, to me this is beside the point. If you have a submarine which is fully adequate to launch Polaris missiles, and if you have a Polaris missile which is of sufficient range to reach the required targets, it seems to me this is a little bit like the discussion of the importance, from the ICBM standpoint, of the admitted larger thrust that the Russians have as compared to our own. We have an adequate thrust to take a warhead on an ICBM range to the selected targets in the Soviet Union. If you have twice that much thrust, it doesn't help you, from a missile standpoint. It does, of course, help you from an outer space standpoint, and I don't want to discount the importance of it, but it is not of real importance in the ICBM capability.

POLARIS ADEQUATE FOR TARGETS PRESENTLY ASSIGNED

Mr. Weisl. Then there was no point to building the Polaris at a 1,500-mile range.

Secretary McElroy. We are going to improve it, consistently, Mr. Weisl, because we would like to have even more targets that we could reach with the Polaris missile. But for the present, it has adequate range to reach the share of targets that we would assign to the Polaris.

Mr. Weisl. Now, you are canceling the Regulus in the hope, and it is a solid, expected hope, that you will have the Polaris by the fall of this year, despite the fact that no tests, complete tests, have yet been made of the Polaris, and despite the fact there have been some delays connected with the development of the Polaris.

Secretary McElroy. May I just amend your date, Mr. Weisl? You said the fall of this year.

Mr. Weisl. The fall of 1960; I beg your pardon.

Secretary McElroy. I wanted the record to be straight; the fall of 1960. There has not been a firing of a complete Polaris missile, and there will not be until this spring. This is, however, again something which has been carefully weighed by the scientists that advise us, and we believe that this is a prudent and conservative kind of decision.

Mr. Weisl. But it is a risk.

Secretary McElroy. Absolutely; we have many of them.

Mr. Weisl. Only a few days ago after firing a successful test of the Atlas, you had an unsuccessful firing of the Atlas.

Secretary McElroy. I feel quite sure, Mr. Weisl, that as long as we are firing weapons of that complexity, we will have certain of them that don't perform to the optimum kind of range or impact area.

Mr. Weisl. The only question I raise is whether it is prudent to cancel a Regulus II that has a 1,200-mile range in the hope that you will have a Polaris in time to supplant it.

Secretary McElroy. I think it is a valid question, Mr. Weisl, but it is something which was carefully weighed by the best advisers and the best-informed people in the scientific world, and the advice was that this was a prudent decision, and we have taken it.

Mr. Weisl. I understand, or in our previous testimony, our earlier testimony, we were given evidence that the Snark, which was an air-breathing missile that had a range of over 5,000 miles, that was hard to detect on radar, was a wonderful weapon as a deterring instrument against aggression, and the Congress appropriated money for the Snark. As I understand, every test of the Snark has been successful. I am told that the Snark was not only flown 5,000 miles, but flown back to its base.

Now the Snark program has been canceled.

Will you please tell the committee why the Snark program was canceled, in view of the need for deterrent weapons to deter an enemy from striking us?

SNARK WAS A CASUALTY OF SCIENTIFIC PROGRESS

Secretary McElroy. I would like to say, Mr. Weisl, I think these questions are good questions and thoroughly appropriate, and I am glad to answer them for you and for the American people.

The Snark is a fine interim weapon. What has been going on in the missile field, however, is what goes on in any new field, whether it is in military or whether it is in industry. When you get a brand-new field, the initial entrants in the field are going to have a short life, because the learning is so rapid that successive generations come along very fast.

You could look down the road and expect that that would not be true indefinitely in the missile field.

This is what happened in the case of the Snark. The Snark is a good weapon, but it has the vulnerability, compared to the ballistic missile, of the relatively slower air breather, which, of course, the Regulus is, and the same general kind of thing that I am about to say with respect to the Snark is the kind of thing I have said concerning the Regulus II versus the Polaris.

As we have found that our program on the ballistic ICBM's has moved forward somewhat more rapidly than we had anticipated, it

has seemed to us prudent to put our reliance in the missile field on an expansion of that ballistic missile program, because of the considerably greater invulnerability to defense which the ballistic missile has as compared with the air breather.

We think the Snark is a good weapon, just as we thought and still think that the Regulus II is a good weapon, but we think it is not as good as a successor weapon, the Atlas, and a successor to that, the Titan.

Mr. WEISL. There will always be new generations of weapons, will there not?

Secretary MCELROY. I am sure there will, unless we don't do our job well.

Mr. WEISL. And this committee in its recommendations said that while we were waiting for these new generations of more sophisticated and more efficient weapons, we must not overlook the forces in being, and be sure while we are waiting for these blueprints to go into production, we must have forces in being, and that is why this committee felt that the Snark and the Regulus II were very efficient and dependable weapons to have until we were sure that we had these other more sophisticated weapons.

Secretary MCELROY. We are fully in accord with the principle that you enunciate there. It is an absolute requirement in the military that you not forsake a capability in being for what you hope will be around the corner, and then maybe have an interim period when you don't have either one, and that, of course, is one of the things that makes this all very expensive.

AIRCRAFT CONSTITUTE PRESENT BASIC DETERRENT FACTOR

We regard our basic capability to deter during this period, and I would say probably for the year or two ahead, as a minimum, to be our aircraft deterrence. In order to protect that, as this committee well knows because it highlighted these things last year, our program on dispersal and alert is proceeding on schedule. Moreover, as the appropriations will indicate when they are examined in detail we are proceeding further to modernize the bomber fleet by including numbers of B–52's, B–58's, in the 1960 program, and thus gradually replacing the B–47 as the years go ahead.

Mr. WEISL. In evaluating the capacity of the Soviet Union, I would like to call your attention to the testimony that was taken in our long hearings conducted over 13 or 14 months ago.

At that time the testimony was that the Russians had launched a successful intercontinental ballistic missile test, that they had followed that with the launching of three sputniks—two sputniks, Sputnik I and Sputnik II, and that subsequently a lunik launching of a sputnik was made, passing the moon and allegedly into the vicinity of the sun.

The testimony of our scientific experts, Dr. Teller, supported by statements by Dr. Lawrence, Nobel Prize winner, whom President Eisenhower selected to represent this country in discussions with the Russians on inspection of atomic capacity, and so forth, all testified this proved beyond any doubt that the Russians had the capacity to manufacture quantities of ICBM's.

Do you recall that testimony?

Secretary McElroy. I don't remember their saying that it proved that they could manufacture quantities, because I don't see anything in the fact that they launched one that would indicate that they can manufacture quantities. I think it proved they had one.

Mr. Weisl. I don't mean quantities; I meant it proved their capacity to manufacture ICBM's.

Secretary McElroy. I thought you said quantities.

Mr. Weisl. If I did, I am sorry.

You are telling this committee that based on one successful firing of a complete Atlas, the test having been made only a month ago, that we will have in operation a squadron of ICBM's with a trained crew, and with a proper base.

Why, then, isn't it prudent to assume that the Russians, who tested an ICBM 15 months before that, can do the same thing?

Secretary McElroy. Well, this goes to the point of what makes up the reason for our intelligence estimates. We are basing our plans for the defense of this country on the agreed intelligence estimates, but I think to go any further into those would probably require executive session.

Mr. Weisl. I am just talking logic. If we can do it, why should we assume that they cannot?

Secretary McElroy. I think we would have to explain to you why the intelligence estimates are what they are, and as I say, I think that would have to go into executive session.

Mr. Weisl. Now, the sputniks that were launched by the Russians, our scientists tell us, the payload of those sputniks—or the last sputnik, not the lunik one—was 20 times the weight of the Atlas satellite that was launched in orbit. Is that correct?

Secretary McElroy. I don't remember——

PAYLOAD WEIGHT EXAGGERATED SINCE WHOLE ATLAS ORBITED

Mr. Weisl. The reason I asked that question is because there was wide publicity that the Atlas missile in orbit was heavier than the payload of the sputnik that was put in orbit, and when I asked Dr. Homer Joe Stewart, who is the head of the planning division of the National Aeronautics and Space Administration, and who was formerly the scientific adviser to this committee, he told me that the weight of the sputnik payload was 20 times that of the Alas that was placed in orbit.

Secretary McElroy. If he said that, I am sure that is right, because the entire weight that was featured so much in the newspapers of the Atlas satellite was not the payload weight. The payload weight was greatly less, because the entire Atlas orbited.

Mr. Weisl. I know, but the weight of the payload is the thing that counts.

Secretary McElroy. Sure; there is no question about that. I don't differ with what is being said here at all.

Mr. Weisl. Now, in your interview with the President, Mr. Secretary, you stated, and I quote:

> We are in a position in this country where we have available to us a diversity of delivery systems. The Russians, on the other hand, have no advance bases. must rely on intercontinental ballistic missiles to reach this country.

Is that a correct quote of your statement?

Secretary McELROY. As far as missiles are concerned.

Mr. WEISL. As far as missiles are concerned.

Don't you consider a submarine that can launch a missile an advanced base?

Secretary McELROY. Yes, we concede them some small submarine-launched missile capability, but not very large.

Mr. WEISL. Not very much.

Let me call your attention to a public statement made by Admiral Hayward, who was the head of the Naval Research Division. This statement was made over television to millions of people, only 3 weeks ago, and I quote:

> How many submarines do you think that they could throw against us, submarines armed with missiles?
>
> Admiral HAYWARD. There is no reason why they couldn't put as many as a hundred, if they wanted to. There is nothing to stop them from doing it.

Now, that is a statement of Admiral Hayward, made January 4, this year, over television.

Secretary McELROY. Well, you have to take that in exactly the way he said it. He said if they wanted to. That doesn't mean, at least it doesn't read to me, that they are equipped with a hundred submarines that have a capability of launching missiles. Is that what that means to you? I don't know.

Mr. WEISL. If I understand English, that is what he said.

I am told my time is up, Mr. Chairman.

Secretary McELROY. We do not concede them that capability. I am talking again here, I am talking again as an agreed intelligence estimate, Mr. Weisl.

Mr. WEISL. Well, Nelson Rockefeller, who testified under oath before this committee over 12 months ago, said that he had a committee of experts, military men, scientists, manufacturers, businessmen, who studied this problem, and he testified 12 months ago there is no doubt about the capacity of the U.S.S.R. to adapt ships and submarines to launch short- and medium-range missiles.

WHAT THEY HAVE CAPACITY FOR AND WHAT THEY CHOOSE TO DO MUST BE DISTINGUISHED

Secretary McELROY. We concede the capacity of the Soviet to do a good many things, if they make the determination to do so. This comes right to the very root of the discussion that is going on in rather heated ways about how many ICBM's the Russians are going to have at a given time.

We concede that they have the capability to do the manufacturing of various types of weapons, because these people have got scientific know-how and they have got production know-how.

What is required here, and this was also true of the heavy bombers, where we thought they were going to produce many, many heavy bombers, General Twining himself, when he was Chief of Staff of the Air Force, came back from Russia and testified that this was something that we had to be very apprehensive of, they had the capacity to produce great numbers, they did not make the national determination to do so; and they may do this in the case of the ICBM's.

We do concede them capacity, but no one that I know of can be inside of the Russian mind and decide what proportion of that capacity they are going to use.

Senator JOHNSON. Mr. Secretary, are you basing the defense of this country upon the assumption that the Russians won't want to attack?

Secretary MCELROY. Quite the contrary. We are basing our budgeting of defense for this country on the assumption that they will use their capability to produce ICBM's. But nevertheless, that does not mean that they will, and I think the public of this country should know that the figures that we have can only be what they could do; we cannot know what they will do.

Senator JOHNSON. As I understood your testimony, I thought you said that you realized they had the capability but that didn't necessarily mean that they would attack, and——

Secretary MCELROY. Oh, no.

Senator JOHNSON. I hope we are not basing our defense on the assumption that they won't attack.

Secretary MCELROY. No, my point was not capability to fire; it was capability to produce, capability to produce weapons. They have the scientific know-how, they have the production know-how, and whether they decide to produce them will be just a decision as to how they want to use their national resources. That is our kind of decision, also.

Senator JOHNSON. Mr. Secretary, before I ask other members to ask questions, I would like to ask two or three general brief questions.

Are you ready to say that our preparedness program represents everything that reasonable men and prudent men think should be done to insure the defense of this country?

Secretary MCELROY. Yes, sir.

Senator JOHNSON. You said in your preliminary statement that the Joint Chiefs of Staff approved the budget as adequate, but that each had some reservations on parts of the program.

Would you elaborate very briefly on the reservations the individual Chiefs may have?

THE CHIEFS WERE POLLED AS TO OUR OVERALL CAPABILITY

Secretary MCELROY. Yes. What I did—I will go back very briefly, because I don't want to use a lot of time.

What I did was what I think any of us would have done. At the conclusion of the budget-making process, which is handled on the basis of individual service development, I took the individual service budgets and asked the Joint Chiefs of Staff as a corporate body to consider the mutually reinforcing elements here as a whole, and say to me whether, in the total, in the totality of these, they represented a combination which would be adequate for the defense of the country. This is the point at which these statements were made about the adequacy of these programs.

Now, at the same time, it is clearly understood that certain parts of the Army program—and this would even go to the point of personnel, the size of their forces—they would like to see higher. I think this would be equally true of the Marines. I think the Navy would

like to see more ships, and I am certain that the Air Force would like to see larger numbers of various elements in their program.

The point, though, that seemed most significant to me and to us who had to make the ultimate decision, was their belief that in total, which it seemed to us is the real way to look at this, they felt that the country's security was adequately protected.

Senator JOHNSON. How much time did the Joint Chiefs have to spend on the budget after it was handed to them?

Secretary MCELROY. In this particular final stage they had, I would say, not more than a couple of days.

Senator JOHNSON. Who prepared that, incidentally, and sent it to them?

Secretary MCELROY. Who prepared——

Senator JOHNSON. The budget and who sent it to them?

Secretary MCELROY. The people who prepared the budget were these individual services.

This is the way a budget is prepared: Each service prepares its own proposals. This goes on, starting in July. It goes right——

Senator JOHNSON. I understand that. But wasn't this budget prepared by the Budget Bureau and by the assistant Secretary in charge of fiscal matters for the Defense Department, and then brought to the Joint Chiefs, who were told "Here are the limitations and here is what we propose to do"?

Secretary MCELROY. All he did was the paper work of putting together the budget which had been prepared by the individual services, but except for the compilation——

Senator JOHNSON. That means, then, the individual service's requests were respected, and are incorporated in the budget?

Secretary MCELROY. They were to the extent that it was decided by the Secretary of Defense and by the President, of course, that these were the amounts that were needed.

Senator JOHNSON. So, in effect, then, the Secretary of Defense and the President set the limitation and got the Joint Chiefs to sign up that this was adequate, but with reservations which meant, "don't blame me if we get a shellacking."

Secretary MCELROY. The President and the Secretary of Defense always set the budget, Mr. Chairman, and we did this year, finally. We did it under the best advice, which was our military advice, and then this was submitted to the Joint Chiefs, who have very substantial independence in expressing their views, and they have expressed the views that I have quoted.

TIME INVOLVED IN CONSIDERING BUDGET

Senator JOHNSON. And they had at least 2 days to consider it?

Secretary MCELROY. They had 2 days on top of what had been 4 to 5 months of consideration of these same matters as they were generated through the individual services.

Senator JOHNSON. You think that is adequate time for them to spend in determining the adequacy of the strength of their individual service?

Secretary MCELROY. They considered it adequate, considering the entire time that they had spent on the preparation of this budget which, as I say, went clear back to the month of July.

Senator JOHNSON. Mr. Russell?

Mr. Bridges?

Mr. Stennis?

Senator STENNIS. Mr. Secretary, the questions here have been about the missile program, and I was interested in our present possible overall striking power. I don't know just how far you would go with reference to making a description of all those possibilities now. But within the limits of security, what are you chiefly relying on as a matter of deterrent. Go as far as you can in giving the particulars on that.

Secretary MCELROY. Our principal reliance at this time, Judge Stennis, is on the heavy and medium bomber capability of the Strategic Air Command. That is certainly No. 1.

We have, however, major supplements to that in being.

In the Air Force, for example, we have important elements of the fighter-bomber units of the Tactical Air Force, and these can carry and have available to them in their advanced positioning the heavy weapons that can be delivered, so long as these aircraft do not have to operate at the high range which the heavy and medium bombers do.

In addition to those, we have highly capable aircraft for heavy weapon delivery on board each one of the major attack carriers, which are in their forward positions.

In addition, we have certain of our submarines that are equipped to Regulus I. We have in advanced positions the Matador, which is a long-range missile operated by the Air Force, and in due course this will be supplemented and succeeded by the Mace, which is the next generation of that particular missile, which has a mission which is similar to that of the Tactical Air Force.

In addition to these, we have positioned with our allies in Western Europe an increasing number of IRBM's the first ones, of course, being placed in Great Britain, and we are hopeful that there will be a decision at an early time because this matter has been under negotiation for some time, of some deployment of these missiles in other European countries.

So it is really a combination of all of these things which we regard as our deterrent power today.

General Twining points out to me that I should say, that these are the forces which are in being now, all of which are capable of delivering atomic attack against Russia if the bell should ring today, which of course we hope it doesn't do.

Senator STENNIS. Well, your reference there to the Matador as long-range, do you call that a long-range weapon?

Secretary MCELROY. Several hundred miles.

Senator STENNIS. Beg pardon?

Secretary MCELROY. Several hundred miles, yes. It is not long range in the sense of an IRBM——

Senator STENNIS. Yes.

Secretary MCELROY. But it has moved rather far forward so that it can reach important enemy targets.

Senator STENNIS. Well, what weapons do you consider the main threat from Russia as of now?

MAIN RUSSIAN THREAT NOW IS IN ITS HEAVY AND MEDIUM BOMBERS

Secretary McElroy. The main threat from Russia as of now is their heavy and medium bomber fleet. There could be a relatively few submarine-based, relatively short-range missiles of the air-breather type. We do not think at this time that that capability of Russia is very large.

Now, I would assume that they would build up, as we intend to build up, a capability somewhat like that of the Polaris, because there is no reason why they can't do so within their technical knowledge. We think we will be ahead of them, but I think over a period of time you might as well assume that they will have them.

Senator Stennis. One thing that I have been concerned about is what is told the American people. They are told so many things, and with reference to Admiral Hayward's statement awhile ago that Mr. Weisl made, it seems to me like the only interpretation of that, certainly the one to be given by the man who sits in his living room and listens to the television, or the man who runs and reads, would be that that capability of Russia existed now, that they have that power to throw those weapons at us now.

So your statement corrects that, does it, and says it is not in existence now?

Secretary McElroy. Well, my statement corrects that particularly as to its size. But I think it might be desirable, Senator Stennis, for General Twining to comment on that if you would like him to, within the limitations on this as a public session.

Senator Stennis. Well, I think I have only 1 minute left here.

Secretary McElroy. All right.

Senator Stennis. And we can get into that later. Of course, someone else can ask it, or he can bring it in.

Now back to this question of what you are relying on, did you mention the Regulus when you said you were relying on these bombers? What was it you said about the Regulus?

Secretary McElroy. The Regulus I.

Senator Stennis. Regulus I?

Secretary McElroy. That is right, submarine based.

Senator Stennis. Submarine what?

Secretary McElroy. Submarine based; submarine launched.

Senator Stennis. Well, is it a classified question to ask you how many of those that you have that you could use now?

Secretary McElroy. I believe it is classified. We will be glad to check that.

(The information is unclassified and is as follows:)

There are presently four submarines and four cruisers equipped to fire Regulus I missiles.

Senator Stennis. Yes; I suppose my time is up, Mr. Chairman. Thank you.

Senator Johnson. Senator Saltonstall?

Senator Saltonstall. Thank you, Mr. Chairman.

Mr. McElroy, there have been several statements made that you have a written statement by the Joint Chiefs of their approval of the budget.

Secretary McElroy. Yes, sir.

SECRETARY AGREES TO PUT BUDGET APPROVAL DOCUMENT IN RECORD

Senator SALTONSTALL. Would you be willing to put that in the record?

Secretary MCELROY. Senator Saltonstall, we do not release papers of the Joint Chiefs, but this, in my opinion, is more in the nature of a memorandum from the Joint Chiefs to the Secretary so that in this instance, I think, it would be appropriate to put it in the record, if the committee would like to have it.

Senator SALTONSTALL. Mr. Chairman, I would like to ask if it takes unanimous consent—I would like to have that put in the record. I do not know whether it takes unanimous consent, but I would like to have it in the record.

Senator JOHNSON. What is your request, Senator Saltonstall?

Senator SALTONSTALL. My request is that the statement—which has been referred to several times—of the written approval of the Joint Chiefs of Staff to the Secretary as to the amount of the budget, with certain exceptions, be put in the record.

Senator JOHNSON. Is there objection?

(No response.)

Senator JOHNSON. The Chair hears none.

Does the Secretary now have the statement for the record, or will he supply it later?

Secretay MCELROY. I think I probably have it. I think I have given you most of the significance of it, but I can read it now.

Senator JOHNSON. I think some questions might be based on the contents of the statement.

Senator SALTONSTALL. Does the reading of it come out of my time, Mr. Chairman?

Senator JOHNSON. No.

Secretary MCELROY. It will not take long. [Reading:]

The Joint Chiefs of Staff consider that the fiscal year——

Senator JOHNSON. I am sure the Senators want to have available the statement that the Secretary is putting in the record, and we will do it on committee time.

Senator SALTONSTALL. I would not get into an argument with you, Mr. Chairman, on that one.

Senator JOHNSON. Proceed, Mr. Secretary.

Secretary MCELROY. It is very brief. [Continues reading:]

The Joint Chiefs of Staff consider that the fiscal year 1960 proposed expenditure figure of $40,945 million is adequate to provide for the essential programs necessary for the defense of the Nation for the period under consideration. They find no serious gaps in the key elements of the budget in its present form, but all have reservations with respect to the funding of some segments of their respective service programs.

Senator SALTONSTALL. Thank you, Mr. Secretary.

Now the question I would like to ask you is this——

Senator JOHNSON. Mr. Saltonstall, may I ask a question, now?

Is that the signed copy that the Joint Chiefs were asked to sign?

Secretary MCELROY. This is a transcript of it. Would you like to have a photostat of it?

Senator JOHNSON. I should like to have the exact copy that they were asked to sign. Then I should like to ask that each Chief, if he

desires to do so, spell out any reservations he may have regarding his service for this record.

Secretary McElroy. Do you not expect to see all of those men before this committee, or do you?

Senator Johnson. Yes; we expect to see them.

Secretary McElroy. All right, you would like it written in.

Senator Johnson. I want a signed statement. Do you object to that?

Secretary McElroy. Not at all; no, sir.

Senator Johnson. Fine. Thank you, if you will comply with that. Go ahead, Mr. Saltonstall.

Senator Saltonstall. I think, Mr. McElroy, that ought to be put right in following this statement so that it will be all together. I mean what the chairman has asked, as I understand it, is that the Chiefs, over their signature, spell out their reservations, as well as the Joint Chiefs. That is perfectly fair.

Secretary McElroy. This will be an interesting list. [Laughter.]

Senator Saltonstall. I could comment on that one, too, but I won't.

(The documents referred to are as follows:)

The Joint Chiefs of Staff,
Washington, D.C., January 19, 1959.

Memorandum for the Secretary of Defense.
Subject: Joint Chiefs of Staff position on the fiscal year 1960 budget.

The Joint Chiefs of Staff consider that the fiscal year 1960 proposed expenditure figure of $40,945 million is adequate to provide for the essential programs necessary for the defense of the Nation for the period under consideration. They find no serious gaps in the key elements of the budget in its present form, but all have reservations with respect to the funding of some segments of their respective service programs.

N. F. Twining,
Chairman, Joint Chiefs of Staff.
Maxwell D. Taylor,
Chief of Staff, U.S. Army.
Thomas D. White,
Chief of Staff, U.S. Air Force.
Arleigh Burke,
Chief of Naval Operations.
R. McC. Pate,
Commandant, U.S. Marine Corps.

Reservations of Adm. Arleigh Burke, Chief of Naval Operations, Concerning the Navy Fiscal Year 1960 Budget

1. As Chief of Naval Operations my concern is to keep Navy capabilities up to the level where the Navy can do what it will be required to do, now and in the future. We must strike a balance, within the resources made available to the Navy, between immediate readiness and future capability.

2. In response to questions by this committee, I stated I had certain reservations with regard to this budget, which reservations related to Navy capabilities to respond to unforeseen demands of national policy and to provide the quality of Navy which will be required in the future.

3. The budget areas in which I have reservations are these:

(*a*) Maintenance and modernization of ships and aircraft.

(*b*) Procurement of new ships, new aircraft, guided missiles and their associated electronic equipment.

(*c*) Acceleration of ASW (antisubmarine warfare) progress.

(*d*) Rate of procurement of FBM (fleet ballistic missile) weapon systems.

(*e*) Increased research and development effort.

Reservations of General White, Chief of Staff, U.S. Air Force, Concerning the Air Force Fiscal Year 1960 Budget

This statement is in reply to the direct request of the chairman, Senate Preparedness Committee. It confirms oral examples given to the committee at the time of questioning and completes my recital of reservations concerning the Air Force fiscal year 1960 budget.

The present Air Force fiscal year 1960 budget does not permit the replacement of B–47's as rapidly as requested. While certain scientific advisers do not feel that we are ready to start building a nuclear powered aircraft, I consider that our aircraft nuclear powered program (ANP) is sufficiently advanced so that we should proceed with construction of the prototype development airframe and should accelerate the propulsion phase of the program. The density of coverage that will result from the Bomarc procurement proposed in this budget is substantially less than the Air Force initially submitted.

The Air Force military construction program is marginal in terms of support type of facilities and does not provide for the cumulative and growing deficit in many equally important areas. In fiscal year 1960 the Air Force operations and maintenance funding is minimal and will require deferral of certain programs which it would be desirable, and in some cases more economical, to accomplish with fiscal year 1960 funds.

Reservations of Gen. Randolph McC. Pate, Commandant of the Marine Corps, Concerning the Navy Fiscal Year 1960 Budget as it Affects the Marine Corps

My reservations respecting the funding in the 1960 budget as related to Marine Corps requirements, which I am now presenting in response to committee invitation, involve four categories: personnel, ships, aircraft, and provisions for construction and maintenance of facilities. Of these, I regard the first, personnel, as paramount.

With respect to personnel, it has been and is my firm conviction that to carry out its assigned missions, the Marine Corps requires personnel to adequately man three divisions and three aircraft wings. My initial budget calculations were based on 200,000 marines. The 1960 budget as submitted to the Congress provides for 175,000 marines. Thus, my first reservation results from the level of manpower under which the Marine Corps will operate in fiscal year 1960.

With respect to the Navy construction program for amphibious assault ships (LPH's), there has been progressive slippage starting from its inception. The 1960 new construction provides for but one LPH, which, added to the two on which construction has been started will result by fiscal year 1963 in only three modern helicopter assault troop carriers. Thus, my second reservation is that new ship construction provided by this budget will fall short in effecting the transition to modern amphibious techniques.

In the aviation area, I must relate Marine Corps requirements to the overall framework of naval aviation. Aircraft procurement in this budget, as stated by Admiral Burke to the committee on January 29, 1959, does not meet the requirement of aircraft arising merely from predicted attrition. We are thus faced with the inevitable prospect of declining inventory of aircraft with all that means in terms of exploitation of sea power. Thus, my third reservation involves the decline in naval air strength which will surely result.

With respect to maintenance and construction of facilities, the Marine Corps at the start of the budget cycle stated its requirements at approximately $45 million. The budget under consideration will provide $9 million of that amount. Thus, my fourth reservation concerns the continued deterioration of facilities and the slippage of new construction which has characterized our supporting establishment during the entire postwar era.

The foregoing statement of reservations, it should be remembered, are made from my vantage point as a chief of service. While to me they involve matter of personal conviction, it is patent that other considerations additional to those available to me as a military man, must be and have been applied to the problem areas in which I entertain the foregoing reservations.

RESERVATIONS OF GEN. MAXWELL D. TAYLOR, CHIEF OF STAFF, U.S. ARMY, CONCERNING THE ARMY FISCAL YEAR 1960 BUDGET

On January 19, 1959, the Joint Chiefs of Staff submitted a memorandum to the Secretary of Defense, subject: "JCS Position on the Fiscal Year 1960 Budget." The following statement is to clarify my position, as requested by the chairman of the Senate Preparedness Investigating Subcommittee, with regard to my reservations with respect to certain Army programs, mentioned in the January 19 memorandum.

The reservations which I had in mind pertain specifically to four major Army programs. These are (1) Army modernization, (2) the antimissile missile (Nike-Zeus) program, (3) the personnel strength of the Active Army and the Reserve Forces, and (4) the Army surface-to-air missile program.

MODERNIZATION

The Army's modernization program is designed to achieve both modernization of the existing inventory and a gradual increase in quantity of inventory to meet the estimated combat and training requirements of the early months of mobilization and of war. The first step each year is to seek funds to replace the average annual inventory loss due to consumption, wear out, and obsolescence. Experience indicates the need to replace annually for these causes about 10 percent of the current equipment inventory. As the value of the Army inventory is approximately $14 billion, the annual sum required for replacement is about $1.4 billion.

A second requirement is to increase gradually the Army's inventory level from $14 billion to a level of $20 billion, the quantity of equipment which is needed in our supply system to meet the early requirements of mobilization and combat. This level constitutes the Army materiel objective which we wish to attain in a 5-year period. Thus, in addition to the $1.4 billion for replacement, the Army seeks another $1.2 billion as an annual increment of a 5-year plan to increase the inventory to meet the materiel objective mentioned above, and about $200 million for industrial mobilization and transportation. Therefore, a procurement appropriation of approximately $2.8 billion per year (exclusive of Nike-Zeus) over a 5-year period is needed to support this phased program to provide the Army with ample modern equipment. Again this requirement of $2.8 billion, the fiscal year 1960 budget will make available $1.19 billion for procurement and $176 million for industrial mobilization and transportation. The $1.19 billion amount is about $200 million less than the amount required to offset the annual drawdown in inventory due to consumption, wear out, and obsolescence and makes no provision for building up our present inventory from $14 to $20 billion.

My reservation with regard to this program arises from concern over the inability under the fiscal year 1960 budget to make the desired progress in modernizing the present equipment of the Army and in acquiring the necessary additional quantity of materiel.

THE ANTIMISSILE MISSILE (NIKE-ZEUS)

Nike-Zeus is provided sufficient funds in the fiscal year 1960 budget to continue research and development at an optimum rate. It is the only system currently under development which will be capable of defending our retaliatory forces and our vital centers against intercontinental and submarine launched ballistic missiles. No funds are provided to initiate production of tactical equipment and missiles.

My reservation in this area arises from the unopposed ICBM threat and my conviction that the importance of obtaining this unique antimissile weapon at the earliest possible date outweighs the possible financial risks inherent in initiating selective production now.

PERSONNEL STRENGTH

During the development of both the fiscal year 1959 and fiscal year 1960 budgets, I recommended that the Active Army be maintained at a strength of 925,000, 15 divisions and the Reserve components at a paid drill strength of 700,000. The fiscal year 1960 budget will provide an Active Army strength of 870,000, 14 divisions and a paid drill strength of 630,000 for the Reserve components.

My reservation with regard to the personnel situation in the Active Army is based upon the results of reports and of my personal visits to the principal Army commanders abroad and in the United States, all of whom consider their personnel resources as inadequate to meet in full the requirements of their assigned missions. In order to compensate for the shortage of American personnel, Army commanders in Europe and Korea have been obliged to incorporate large numbers of foreign nationals into combat and support units, thus incurring a heavy dependence upon foreign personnel which might have serious consequences in an emergency.

With regard to the reduction in the paid drill strength of the Reserve components, my concern is over the adverse effect on the reorganization of the National Guard structure currently under negotiation with State Governors and the adverse impact of the reduction on the readiness of many National Guard and USAR units to meet the desired mobilization time schedule.

SURFACE-TO-AIR MISSILES

Army objectives in numbers of surface-to-air missile units for the continental air defense and for air defense in overseas theaters are determined by the Joint Chiefs of Staff after consideration of the recommendations of the commander in chief, Continental Air Defense Command, and the commanders of unified commands. The funds for Army surface-to-air missiles in the fiscal year 1960 budget fall substantially short of those needed to reach the goals recommended by the Joint Chiefs of Staff.

My reservation in this field is over the failure to make sufficient provision for these air defense weapons which will be needed for the indefinite future to cope with the high and low altitude threat of the manned bomber and the air-to-surface missile.

SNARK TO BE LIMITED TO ONE SQUADRON

Senator SALTONSTALL. Now, then, the thing that interests me is this:

You stated in answer to Mr. Weisl that you have slowed down or canceled the future program of the Snark and of the Regulus II, is that correct?

Secretary MCELROY. Well, the Regulus II did not go into manufacture at all. The Snark was simply established on a one-squadron basis, and we are buying out and concluding the production after that squadron is provided for.

Senator SALTONSTALL. Well, now, your problem and the problem of the Defense Department is always, am I not correct, Mr. McElroy, the problem of balancing the size of the present inventories of weapons that are known to be of retaliatory value against keeping those inventories down because of stronger weapons and weapons of bigger retaliatory power that are coming along in research and development stages. Is that not correct?

Secretary MCELROY. It is a constant problem as to how to phase in the new weapons and still have the capability in being that you require so that that there won't be any time in between when you will not be able to protect yourself.

Senator SALTONSTALL. So that when you cut out the Regulus II, and you cut down on the Snark, you are doing that with the idea that you have got the Atlas, the Titan, and these other weapons that are coming along that would be of more value to you?

Secretary MCELROY. That is right, and in the meantime adequate protection basically from our aircraft protection.

Senator SALTONSTALL. Now, in your opinion, is it lack of money that is holding back the development of these weapons, or is it lack

of the time required in scientific development? I say that based on what Admiral Raborn told us last year about the Polaris, where he said money was not holding anything back, and as I remember, General Schreiver said the same thing about either the Atlas or the Titan. I believe it was the Atlas.

Is it, in your opinion, lack of money or time required for scientific development that is the most important at this moment?

Secretary McElroy. It has not been lack of money in these top priority programs. One of the policies we followed has been to take those where the urgency was great and the importance was great, and give them whatever was regarded as at all sound by the scientific community for accelerating the development of such weapons. This would apply to Atlas, it would apply to Polaris. It applies, for example, to the decision we made on the Pershing as related to the Redstone.

Senator Saltonstall. Sometimes we get the feeling that we can eliminate the risk of any attack by the Russians or any other big nation. Now we know, sitting in this room, that is impossible. What we can do is to make that risk as small as possible because of our retaliatory effort.

Is it your feeling at the present time that we are making the effort that will keep that risk of an attack by our retaliatory effort as low as possible? Would you comment on that?

WE PLAN PROGRAM OF SUFFICIENT DIMENSIONS TO DETER RUSSIANS

Secretary McElroy. Our whole planning, Senator Saltonstall, for the future takes into account what we believe to be the Russian capability. We believe that is what we are planning to do in the 1960 budget—and I am certain that this will be the future decision of this or any other administration—what we do beyond 1960 will be of exactly the same sort of dimension, that it will be in whatever dimensions are required to provide a retalitory power which will deter the Russians from ever initiating a general war.

Senator Saltonstall. As Secretary of Defense, advising the President, do you feel that the present budget—that, of course, does not give everybody everything that they want—is a sufficient budget to allow you to go forward with the needs that will keep that risk as low as possible?

Secretary McElroy. I do believe so. I believe so very confidently.

Senator Saltonstall. Thank you, Mr. Chairman.

Senator Johnson. Thank you, Mr. Saltonstall.

Senator Symington?

Senator Symington. Mr. Secretary, I would like to clear the record and then ask a couple of questions.

Last July at the request of the Central Intelligence Agency, I was briefed on the Soviet ballistic missile situation. At that time they gave me the figures of what, to the best of their knowledge, they thought the Russians were doing.

Those figures seemed too low to me, based on other information I had, and so I requested another opportunity to see the CIA officials. At that second session I gave them the reasons why I thought their figures were too low.

When they briefed the committee on this matter in August, they used the same figures. Thereupon, I went to the President and presented in writing the figures that had been given me as the best figures that the Central Intelligence Agency had, and the reasons why I thought those figures underestimated the situation. That was August 29.

Are you acquainted with that letter?

Secretary McElroy. Yes, sir.

Senator Symington. Last December I again went to the Central Intelligence Agency, at the suggestion of the White Houes, and was briefed again. The same ballistic missile figures were given me that had been given me in July and August and December.

Also I went out to the west coast last month and was given the same figures that I had received from the Central Intelligence Agency in July and August and December, by proper people on the west coast.

Then in your most recent appearance before the Senate Armed Services Committee, those figures had been changed radically for the years in question, and I am wondering if you would care to comment why that was

BASIS FOR CHANGE IS QUESTION FOR EXECUTIVE SESSION SAYS SECRETARY

Secretary McElroy. Well, as I said here before, what your are asking is that we discuss the basis on which national intelligence estimates are prepared, and I think that any discussion of this would have to go into executive session.

Senator Symington. So the downgrading of the figures that you gave in January, as against the figures that you gave me in July, August, and December, cannot be discussed publicly; is that correct?

Secretary McElroy. I would say the corrected figures, I mean, the figures which now are the figures on which our planning is based, should not be discussed, in my opinion, except in executive session.

Senator Symington. The Central Intelligence Agency reports to the National Security Council, does it not?

Secretary McElroy. Yes.

Senator Symington. And the National Security Council has a committee on intelligence; is that correct?

Secretary McElroy. Certainly, the Central Intelligence Agency, the Director of it, is the Director of a group which is known as the committee and gives it——

Senator Symington. What is the name of that committee?

Secretary McElroy. I don't remember; I really don't recall. I can get that if you want it.

Senator Symington. Would you supply the name of that committee for the record?

Secretary McElroy. Yes.

(The information referred to is as follows:)

The Central Intelligence Agency, under the direction of the National Security Council, correlates and evaluates intelligence relating to the national security, and provides for the dissemination of such intelligence within the Government, using, where appropriate, existing agencies and facilitels. It is established by law under the National Security Council, and is charged by law with the responsibility of providing national intelligence to the National Security Council.

In the discharge of his statutory responsibility, the Director, CIA, is advised and assisted, as he may require, by a committee or group known as the U.S.

Intelligence Board. This Board composed of representatives from State, Army, Navy, Air Force, the Joint Staff, OSD, AEC, NSA, and FBI, performs its work under the chairmanship of the Director, Central Intelligence Agency and prepares or concurs in the national intelligence estimates.

Members of the U.S. Intelligence Board, in preparing the national intelligence estimates disseminated by the CIA, may dissent with regard to the conclusions and findings of the Board. Such dissents, when occurring, are duly noted and incorporated in the printed versions of the estimates as footnotes.

The Director of the Central Intelligence Agency has the ultimate responsibility for the national intelligence provided to the National Security Council. He may not be overruled by any member of the U.S. Intelligence Board, but dissents are processed as I have indicated.

Senator SYMINGTON. Is the opinion of the Director of the Central Intelligence Agency the final opinion when it comes to the national intelligence?

Secretary MCELROY. This is—he is the chairman of this committee——

Senator SYMINGTON. I understand he is the chairman of it. Has the opinion of the Central Intelligence Agency been overruled in order to establish these new figures with respect to national defense?

Secretary MCELROY. Well, not so far as I know, and I think it certainly has not been—I don't know who would overrule it.

Senator SYMINGTON. Can a majority of that committee which is chaired by the Director of the Central Intelligence Agency, which composes the intelligence committee of the National Security Council overrule the Director of the Central Intelligence Agency?

Secretary MCELROY. I don't know the answer to that, but I am sure that if there were any majority dissent to the conclusions reached in the national intelligence reports, that this information would come to the attention of the President, and I am sure that the Central Intelligence Agency Chief, Mr. Dulles, would do that himself, because he has no desire to keep anything from the President.

Senator SYMINGTON. Mr. Chairman, I hope that the Director of the Central Intelligence Agency will be asked to testify before this committee in executive session.

Mr. Secretary, do you feel in recent weeks and months that the danger from the Communist conspiracy has lessened, is the same, or has increased?

Secretary MCELROY. I think it is about the same.

Senator SYMINGTON. About the same.

RUSSIANS INTEND TO DESTROY US IN M'ELROY'S OPINION

Secretary MCELROY. I think they intend to destroy us if they can, one way or another.

Senator SYMINGTON. Has the value of the dollar increased or decreased in the last 12 months?

Senator MCELROY. I think there has been probably a modest decline although in the last several months I'd say it is stable.

Senator SYMINGTON. I feel that if we would organize our defenses on the basis of progress instead of continuing to run them on the basis of tradition, we might well have enough money now.

I will be interested to hear what the service chiefs say in response to the chairman's request as to the extent of their backing the budget request. There is question as to whether it is right to back this budget without reservation, particularly since you have requested consider-

ably less money in the future for missile procurement for the fiscal year 1960 than you did for the fiscal year 1959.

How does that explain an emphasis on missiles?

Secretary McElroy. I do not say that it does explain an emphasis on missiles, but I think just your very point of being able to spend money somewhat more effectively comes in there, Senator Symington.

The elimination of a missile like the Regulus, and the concentration on the more modern missiles can give you a considerable enhancement of the effectiveness of your spending of the money even though you may not increase the money appreciably on the overall missile program. In our judgment what we are doing with the money in the 1960 program is a good deal more effective looking toward a real capability in this field than what we have been spending up to this time.

Senator Symington. Your overall expenditures estimate for the fiscal year 1960 is under the fiscal year 1959. Your expenditures estimate for operations and maintenance is under the figure for the fiscal year 1959. Your total expenditures estimate for procurement is $245 million under the figures for 1959.

Your request for new obligational authority for procurement is heavily under the figures for 1959. Your expenditures estimate for aircraft is heavily under the figures for 1959.

I suppose you are making some of those decreases with the premise that the missile picture is becoming more important. You have decreased estimated expenditures for ships and you have decreased your new obligational authority for ships and, nevertheless, at the same time you are also very heavily decreasing your new obligational authority for missiles. Nevertheless, you are entirely satisfied with that.

Secretary McElroy. I think you said, Mr. Symington, that the total expenditures for the year of 1960 were less than the total expenditures expected for 1959.

Senator Symington. The planned expenditures for the Department of Defense have decreased, expenditures have decreased from the year 1959, the estimated expenditures.

EXPENDITURES INCREASING IN 1960 SAYS SECRETARY

Secretary McElroy. I do not understand that because the figures for 1959 are $40,800 million and the figures for 1960 are $40,945 million.

Senator Symington. I'm talking appropriations.

Secretary McElroy. You said expenditures. I do not like to quibble but I believe what we are trying to do is to have the record correct.

Senator Symington. That is exactly right. I'm very pleased that you feel that way about it too, I am also pleased that the counsel is developing the record the way he is.

Mr. Chairman, I have no further questions. My time is up.

Senator Johnson. Senator Smith?

Senator Smith. Mr. Chairman.

Mr. Secretary, there has been much talk about quantity and numbers in the comparison of strength between Russia and the United

States. While the emphasis has been so heavily on quantity, there has been relatively little talk about quality.

It seems to me that vast numbers themselves do not insure military superiority and that there can be a diminishing return on numbers.

For example, if 10 hydrogen bombs are powerful enough to blow up the entire world, what is the value of having 1,000 such hydrogen bombs? The greater the destructive power of a single weapon, the less the need for that weapon in vast numbers.

Just where do we stand in comparison with Russia on quality of weapons such as missiles?

Secretary McElroy. I think I must answer this in general terms until we go into executive session.

We have certain aspects of the intercontinental ballistic missile where we would expect to have superiority. On other aspects we would expect them to have approximate equivalency to us. But to go beyond that, I am afraid we have got to get into the discussion of details which I do not think we can do in open session.

Senator Smith. That may be true of my other questions. I will ask them and you can decide on that when we continue in executive session, if necessary.

Russia seems to have a decided edge on the range of its missiles and satellites. What is the comparison on such quality factors as guidance control?

Secretary McElroy. I do not know that we have the specific information on this as you would like to have, and I would rather doubt that we do.

But again, in executive session we can discuss this. I would like to go back to something I said earlier about range. Once you have the range required to deliver the desired warhead on a target, your ability to send an additional 2,000 or 3,000 miles falls somewhat in the same kind of a class as having a thousand weapons to do the job that 10 would do.

PROPULSIVE POWER GREAT ENOUGH TO REACH ANY DESIRED TARGET

There is no use in overshooting, being able to overshoot your desired target. The real importance of the superior Russian propulsion is in the satellite area, in my opinion, because we have adequate boosters for the delivery of the desired warhead to the desired target areas in the world.

Senator Smith. Mr. Secretary, would you discuss what we are doing or what is being done on miniaturization, on getting more concentrated destructive power packed into lighter and smaller weapons or would that also have to come into executive session?

Secretary McElroy. This would have to come into executive session.

Senator Smith. Mr. Chairman, I have some other questions. I doubt if I have the time. Will you tell me how much time I have left? I will hold my other questions for the next round.

Secretary McElroy. Thank you, Mrs. Smith.

Senator Johnson. Senator Bartlett?

Senator Bartlett. Thank you, Mr. Chairman.

Mr. Secretary, it seems clear from what you said that if war were to come—so far as the United States is concerned, at least—we would be until next summer without the benefit and assistance of intercontinental missiles, is that correct?

Secretary McElroy. That is both what we estimate for the Russian capability and it is also true of ourselves.

Senator Bartlett. Then would you say that the chief retaliatory force of the United States at this time is the manned bomber fleet?

Secretary McElroy. Yes, it is, sir.

Senator Bartlett. Then, Mr. Secretary, would you care to comment upon the statement read by Chairman Johnson representing the third finding of the subcommittee; namely, the Soviet Union was—

closing the gap in manned airpower and at the then existing rate would surpass this country in a comparatively short time.

Do you agree with that statement?

Secretary McElroy. No, not under our present intelligence we do not think so.

Senator Bartlett. Do you believe the United States has a superiority in manned bombers, long-distance bombers?

Secretary McElroy. We think we have a very marked superiority in heavy bombers and a moderate superiority in medium bombers.

Senator Bartlett. And you believe also—I infer from what you said—that this is the weapon upon which Russia would have to rely chiefly at this time?

Secretary McElroy. At this time, that is correct, sir.

Senator Bartlett. Thank you, Mr. Chairman.

Senator Johnson. Mr. Wiley.

Senator Wiley. Mr. Secretary, I should apologize. I was a little late. But I want to compliment you on the way you have straightforwardly given the information. I have only a few questions.

What have we done in relation to detecting submarines? Are we getting ourselves into a position to handle the so-called submarine menace—if there is one—from the Kremlin?

WE HAVE A LONG WAY TO GO IN DETECTING DISTANT SUBMARINES

Secretary McElroy. We have substantial research development programs going on in this field. We have been making steady progress, but we need to make considerable additional progress in order to be able to detect submarines farther and farther out from our own shores.

It is a tough technical problem but we must move in that direction and are doing so researchwise.

Senator Wiley. We are moving ahead, are we?

Secretary McElroy. Yes, sir; we are.

Senator Wiley. You gave a pretty good description, in case of an attack by the Kremlin, of our own defensive methods from this continent, and also from that of our allies. Is that overall picture in good shape?

In other words, from the angle of you who head up the executive department, do you feel that it is constantly being bettered in its ability to be not only the deterrent, but the striking force?

Secretary McElroy. We think it is being consistently improved.

My own belief is that the highlighting of many of these areas of need by this committee in its investigation a year ago has helped those of us in the Defense Department to pursue these in a manner which has improved our position.

Senator WILEY. Now you said that the main arm at present of the Kremlin was its bombers. What is our answer to the bombers? Have we developed any new answer?

Secretary MCELROY. Our answer to the bombers is the several lines of detection which are again being constantly improved so that we can have detection at higher and higher altitudes as you assume that there will be some improvement in the Russian capability with their bombers.

We have a consistently improving system of defenses, a combination of interceptor, manned interceptor, a regional missile, ground-to-air missile defense in the form of the Bomarc, and then a close-in missile defense, ground-to-air missile defense of high priority targets, such as the SAC bases.

Senator WILEY. Interceptor?

Secretary MCELROY. The manned interceptor. We have a defense-in-depth concept.

The manned interceptor is the farther out. It takes the first crack at the incoming bombers. It is then to be backed up in our concept with the Bomarc, which has a rather long range and has the same kind of guidance to target, the SAGE system, which the interceptors will have.

Then for those that get by those first two levels of intercept around the high priority targets, we have in our plan—not all of these are exactly in place at the present time, but it is proceeding under plan—in the close-in areas we would have the Nike.

WE DO HAVE "SHOTS IN THE LOCKER" ASSERTS M'ELROY

Senator WILEY. We have been an inventive people. We are living in a revolutionary age, in an age of invention. Have we any "shots in the locker" that we do not hear about?

Secretary MCELROY. I hope you do not hear about them all. I'm sorry to say that a good many of these things get into the newspapers a little bit earlier than we plan, but we have "shots in the locker," and, of course, we would be glad to share this information with this committee in executive session, but, as I say, we talk about the advanced things in——

Senator WILEY. I am not asking for them. After all, the public is interested in knowing whether we are standing still.

Secretary MCELROY. Senator, our view on all of these elements of the defense program is that the minute you get an operating capability, you ought to be on your way to a successor system.

Senator WILEY. Just one other question; I see I have 1 minute. Your intelligence depends upon the Intelligence Department. Have you any other source?

Secretary MCELROY. Oh yes, the military.

Senator WILEY. The military?

Secretary MCELROY. All of the military, military intelligence which I would say is the major source of all of our intelligence is ground right into these estimates.

Senator WILEY. Thank you, Mr. Chairman.

Senator JOHNSON. Mr. Magnuson?

Mr. Martin?

Mr. Anderson?

Senator ANDERSON. Mr. Secretary, I think I will stay pretty close to the Polaris. The Polaris has been tested a few times with practically all the ingredients in it except one very definite element. Is it permissible to say how many times you have tested it in the last 4 months?

Secretary MCELROY. I would have to supply that for the record because I really do not know specifically.

Senator ANDERSON. Is it objectionable to supply it now? It is four times. I have no hesitation because this has been publicly announced. This was as late as December. It was scheduled to be tested today. Do you know why it was canceled?

Secretary MCELROY. I do not, sir, but I would say, Senator Anderson, that in all of these missile testing programs you have almost invariably some reason why you have to hold a test shot for a little while. The farther down the road you go, the less of that happens.

Senator ANDERSON. The device from which it will be utilized, as was brought out earlier, is not the specifically designed type of submarine. If we have real faith in the Polaris, why don't we start to build one submarine specifically designed to use it?

Secretary MCELROY. This is something a little new to me.

Senator ANDERSON. You may remember that a member of the military thought it would be best to build a specifically designed submarine.

Secretary MCELROY. Yes.

Senator ANDERSON. He was the only person who had much experience with designing of atomic-powered submarines, but his advice was ignored and we are building another type. Now to advance it from 1963 to 1960 is very much worth while.

Secretary MCELROY. Yes.

Senator ANDERSON. I personally feel we ought to find out if the thing will explode when we want it to before we worry too much about it.

But since the Department of Defense believes that all of the elements of it have been tested at least and the guidance system has been tested in something else, why couldn't we then, if we have that much faith, start to build a specifically designed submarine?

Secretary MCELROY. I know that the sixth submarine is an improved submarine, but whether it is meeting what you are talking about, I cannot tell. My information from my Navy friend, who is highly accurate in what he reports to me, Senator Anderson, is that the first three were converted submarines of a more standard atomic-powered type. But that the submarines since then have been designed for the purpose of being specifically better able to handle the Polaris missile.

SENATOR ANDERSON QUESTIONS WHETHER SUBMARINE WAS SPECIFICALLY DESIGNED FOR MISSILE

Senator ANDERSON. I have the feeling that what he might have said to you was that the first three submarines were going to be used

differently and were adapted and the others have been built solidly all the way through, but I question whether one has been specifically designed for it. I wondered when that might come along.

Secretary McElroy. This is something that I am afraid we will have to supply for the record.

(The material referred to is as follows:)

With regard to the question, "Has there been a submarine specifically designed for the Polaris missile?", the facts are these. The first three submarines now building and having the capability to fire the Polaris missile are conversions from the nuclear submarine Skipjack class. The conversion consists of the elongation of the hull and other necessary internal modifications to fire the Polaris missile. The next two submarines to be built will be submarines built from the Skipjack class plans, but having the required design changes introduced prior to construction. In the case of the first three, these were submarines already under some stage of construction.

All other submarines to be built for the Polaris missile system are specifically designed for this purpose. All Polaris submarines reflect a marriage of the hull form derived from Albacore tests and a nuclear-powered plant whether the submarines are of the converted Skipjack class or designed specifically as Polaris submarines.

Senator Anderson. I only want to say, Mr. Secretary, that the questions have been raised as to why we stopped the Snark and why we stopped these other things, and I assume it is being done because you want to make your dollars go as far as possible.

I do think the Polaris is a very promising type, and personally I'd be happy to see it go ahead and I am happy over the advance in date, because 1963 was too late.

I only wish we could do as well in the air with atomic-powered aircraft.

Secretary McElroy. We are in full accord with you, Senator Anderson, about the attractiveness of this missile system. We have a program which is a progressive program under which we expect to have three of these operational in 1960, three in 1961, three in 1962, and three in 1963, and it should be excellent.

Senator Anderson. No further questions.

Senator Johnson. Thank you, Senator Anderson.

Senator Case of New Jersey?

Senator Case, if you will indulge me for just a moment, I should like to make an announcement.

Mr. Secretary, I have enjoyed hearing your candid testimony this morning and your courtesy and patience is appreciated. I am going to have to leave for a meeting. The Senate meets at 12 o'clock and I hope you will understand my reasons. I will be back at 2 o'clock and I hope to join you then. Senator Stennis is the vice chairman of the Preparedness Subcommittee, and I will ask him to preside in my absence.

Again I want to welcome you and thank you for coming.

Secretary McElroy. Mr. Chairman, thank you for your courtesy. May I just say something before you go?

I have a quite important meeting this afternoon with the President and the Secretary at 2:30. My understanding was that others were going to testify this afternoon. Am I correct on that?

Senator Johnson. Yes, I think so. Following you, we have General Twining, Admiral Burke, General White, General Pate, General Schriever, General Power, and, if possible, General Taylor.

Secretary McElroy. As you know, I am available at any time except for a thing of that sort. Thank you for your courtesy, Mr. Chairman.

Senator Stennis (presiding). Senator Case of New Jersey?

Senator Case of New Jersey. Mr. Secretary, in your brief opening statement you mentioned the capacity for limited war as one of the important elements of our defensive strength and an important element in deterrent. I do not think it would be appropriate to ask you to develop that in detail now.

You indicated briefly that you were satisfied that in that branch of our defense we were doing as well as was necessary. Is there any brief statement that you would like to make to amplify that at this time?

EXPERIENCE IN LEBANON AND TAIWAN HAS GIVEN ASSURANCE

Secretary McElroy. I would say that there are a couple of things that give us assurance about this, Senator Case. First would be the fact that in our opinion we were tested in a couple of such situations in 1958. This was in Lebanon and in Taiwan. Again, in our opinion, the response of the U.S. forces in these situations was effective in deterring the outbreak of any hostilities in one instance and in restraining an expansion, a possible expansion of those hostilities in the Far East.

The speed with which you respond is really as important as the force with which you respond, because it seems quite apparent that what is required is to contain it from the beginning.

If you can contain it before it even breaks out, that is ideal. But if it does break out as in the case of the artillery barraging against Quemoy, if it can be restricted to that area and that type of warfare, then you have a chance of working out some sort of discontinuance of the entire conflict.

Now in the last 12 months—and I suppose before that, but that has been the time when I have been in office—we have done much examining of this limited war potential of our own forces on the basis of working with the State Department and with the CIA in estimating what kinds of problems of this kind we might be expected to face in various parts of the world, and then considering our available courses in relationship to what might be those requirements.

This has been very specifically done. This is done by practically assuming these things are going on, and deciding what you would do given units of forces and what might be the response, what you would have to do to bring up additional forces, and so on. So that this entire subject has been given exhaustive study, and I believe personally that this is what gives us the reassurance about our capabilities.

Senator Case of New Jersey. That is a reassuring statement, Mr. Secretary. I thought that I had seen you quoted at one time as believing that if we had to handle or deter a big war, it followed from that that we could deal with small wars and this was a troublesome thing with me, and I take it this is not an expression of view that you ever held?

Secretary McElroy. No; this is not true.

The thing that we do say is that unless we maintain our capability to restrain a big war, then you are not likely to have the option of the conflicts in the world being limited to the small war type of conflict.

Senator CASE of New Jersey. I am sure that no one will disagree with that.

Secretary MCELROY. That was the only thing that I have said, at least that I meant to say.

Senator CASE of New Jersey. I take it that you would think, and certainly there is not time today to develop it, that a discussion of the processes by which you arrived at these conclusions should be given, if at all, in executive session?

Secretary MCELROY. That is right.

I would be very glad to give considerably more detail on this, and also we could go right through the study, if any of the committees would like to go into that much detail in consideration of the question.

Senator CASE of New Jersey. Mr. Chairman, I do not have any further questions, but I would just like to make one observation if I might, at this time. Concerning the point we were just discussing: capability in regard to limited war situations, and a number of other matters, for instance, Russian capacity to attack us with intercontinental missiles, submarine, aircraft, and whatnot; the schedule of our own production, and the coming availability of missiles and other weapons; and the relative quality about which Senator Smith asked you as between their weapons and ours.

It has been suggested that all these questions—and I do not, for the time at least, question the rightness or wisdom of this—are matters for executive session. But it does seem to me awfully important that as a result of these hearings the people of this country, and not just members of a small Senate committee, be given the essential facts as well as the conclusions so that they can be satisfied, as they are entitled to be, as to the soundness and wisdom of our programs and their adequacy.

So I will raise this again at a more appropriate time, and this is not said in any immediate criticism of your positon here today, but I think this is perhaps the most important thing that ought to come out of these hearings: public knowledge. Thank you.

WE MUST ACT ON INFORMATION NOT AVAILABLE TO THE PUBLIC

Secretary MCELROY. I might say just very briefly that one of the more difficult things arises from our having to depend for our actions on information which is not available to the public.

We have discussed this a good deal because the public does need to have some understanding, not only about our belief in the rightness of these, but why we think they are right.

Senator STENNIS. May the Chair suggest that the Senators be just a little more careful in speaking close in on the microphone? That is for the benefit of the reporters and others who are entitled to hear.

May the Chair ask for a little better order? We have an obligation to those who come here to be permitted to hear. Humming and conversations make it impossible for many to hear. Those who have to confer please retire from the chamber.

Mr. Kerr?

Mr. Young?

Senator YOUNG. Mr. Secretary, just a question or so regarding the budget. As I understand it, you testified that the Chiefs considered it adequate except that they made reservations for their own services.

Secretary MCELROY. Yes. They said—I think what you have said is correct, sir.

Senator YOUNG. In other words, as to each of their services their reservations were dissents, that is, they considered the budget somewhat inadequate in certain aspects for their own services; is that correct?

Secretary MCELROY. That is right, Senator, and I would say, however, that this has never been untrue in any budget that has ever been created.

Senator YOUNG. Then the budget in its completed form was submitted to the Chiefs and they made those dissents or reservations of it. May I ask, Mr. Secretary, whether any change was made in response to those dissents or reservations?

Secretary MCELROY. These dissents at that stage, Senator Young, were not specific dissents because by this time we had been through repeated examination over a period of months, and final intensive examination over a period of about 4 weeks during the month of November of each one of the individual service budgets.

This was done with the Chief of the service present, with the Secretary and the Under Secretary and various Assistant Secretaries. It is a very comprehensive group of people who participate in these discussions, so that all of these points of view had been expressed many times, and had been given thorough consideration prior to the establishment of the individual service budgets.

Senator YOUNG. That was preliminary consideration?

Secretary MCELROY. Yes, sir.

Senator YOUNG. But then in the end, in the final form, the budget was submitted to each of the Chiefs, in the final form, and then they made reservations?

JUDGMENT REQUIRED FROM CHIEFS AS CORPORATE GROUP

Secretary MCELROY. Yes. At that point we felt that we needed to have a judgment from the Chiefs as a corporate group, not acting as individual service Chiefs.

Senator YOUNG. Yes.

Secretary MCELROY. As to the adequacy of the components of an overall defense budget, because we only have one defense. We do not have a separate Air defense, a separate Army defense, a separate Navy defense. This all ultimately becomes the defense of the United States, and it was for the purpose of getting their corporate appraisal of the validity of that that we submitted the overall to them, and that they made these observations.

Senator YOUNG. Can you state, Mr. Secretary, that 2 days were given to it?

Secretary MCELROY. That is my recollection. I think that is right.

Senator YOUNG. Approximately 2 days?

Secretary MCELROY. Yes; somewhere in that range.

Senator YOUNG. Do you consider that that was adequate time to give full and fair consideration to their dissents?

Secretary MCELROY. Would you like to ask that question of General Twining? I would be glad to answer it. In my judgment it was adequate considering the fact that these matters that are involved in a budget are under consideration by the Chiefs really all the time, and they are under consideration in most specific terms during the entire several months' period that the budget is under preparation.

If they came into this thing absolutely green and without any prior acquaintance with it, I would think 48 hours would be mighty short. But they have the knowledge of the programs in a very accurate and detailed form long in advance.

Senator STENNIS. Senator Young, I'm sorry; you have exhausted your time.

Senator Dodd is recognized for 5 minutes.

Senator DODD. Thank you, Senator Stennis.

I have one question, Mr. Secretary.

I hope it is germane to this inquiry. I am frequently asked by my friends and neighbors: "Why is it that our Government gives so much publicity to our experiments with rockets and missiles while our opponents in the world seem only to announce their successes?"

Could you help me out? I would like to have an answer better than I have had.

Secretary MCELROY. Senator Dodd, I have had some of these same questions. I have some friends that have been similarly inspired to ask. My answer to them is about like this: We have freedom of information here, which does not exist in the other country that experiments with rockets and satellites. The principal launching sites for these are in an exposed area in Florida. Anyone who has been in the area of Cape Canaveral would be able to put a chair—and this is done—on the top of a garage and use binoculars to observe missiles or satellite devices being elevated into firing position.

Also, all of these experimental devices require the help of technicans from contractors. These are not fired by military people. They live off the base. They circulate and of course, the people that operate our press are very resourceful people, and without any exceeding of the bounds of propriety, in my opinion, become friends with these people and learn what they can learn.

The ultimate of all this is that under our system of freedom of the press, which I am sure all of us endorse as one of our basic freedoms, the kind of thing that you are talking about is in my opinion, inevitable in this country. Now we have a few things that we can do where we do not require the knowledge of very many people. One of the examples of that was the *Nautilus* voyage underneath the icecap. In a case like that, you are able sometimes to wait until you have achieved something before you announce it. I think the impact there was better because of that, because you would like to announce your successes rather than so clearly to highspot your failures.

My own judgment is that while this seems like a very bad thing internationally—and I am sure the Russians thinks we are insane—nevertheless, I believe that internationally, over a period of time, the fact that we publicize our failures as well as our successes gives a far greater public confidence in the validity of our successes.

Senator DODD. Thank you very much. That is all I have.

Senator STENNIS. Thank you, Senator. The Chair recognizes Senator Cannon for 5 minutes.

Senator CANNON. Thank you very much, Mr. Chairman.

Mr. Secretary, you stated that the decision on Regulus II was a prudent decision, in your opinion. Isn't it a fact that this decision was based on a very high degree of calculated risk?

Secretary MCELROY. Oh, I don't think so, Senator Cannon, because during all of that period our basic deterrent force will be a bomber deterrent force, anyway.

AIRBORNE ALERT NOT CONSIDERED NECESSARY NOW

Senator CANNON. I understand that you say that the basic deterrent is the aircraft deterrent force. I believe that there is also a misconception among the American public that we maintain a high degree of airborne or air alert. Would you care to comment on that?

Secretary MCELROY. We do not have an airborne alert, if you mean do we maintain a bomber alert which involves flying many of our bombers continuously in the air as a means of protection against being caught on the ground.

That may be necessary at some point. We do not consider it necessary at this stage.

Senator CANNON. And I believe counsel for the comimttee developed your answer that if we were attacked, we no doubt would have many ground installations knocked out in the initial attack.

Is that true?

Secretary MCELROY. This would be less true—yes, I would say so. We would expect, particularly if the medium bombers were used by the Russians on a one-way mission basis, and they wouldn't care about returning their crews—and I think that should be expected in the case of the Russian operation—if they used the bulk of their bomber aircraft, they could inflict considerable damage on this country.

Senator CANNON. You stated that—I believe you stated that we were superior to the Russians in aircraft.

Did you mean in quality, or in quality and quantity of a certain type? What is your explanation?

Secretary MCELROY. Certainly in the case of the heavy bomber, we believe it applies both to quantity and to quality. In the case of the medium bomber, there is no question in our minds about this applying to the quantity, and I am not quite so familiar with the quality comparison.

Just a second. I am informed that we consider that the quality of our medium bomber is also superior to theirs, and something which is pertinent to the inquiry of the counsel earlier: We think that our crews are very much superior to theirs.

Senator CANNON. Would you care to comment on the total quantity of aircraft; the Russian as compared to ours?

Secretary MCELROY. If you add all aircraft together, fighters, bombers, and so on, the numbers are quite similar, in our judgment.

Senator CANNON. Now in your testimony in April of 1958, you stated, I believe, that you thought very highly of the Regulus II.

Have you changed your opinion any concerning that?

POLARIS CONSIDERED TO BE ONLY A FEW MONTHS BEHIND REGULUS

Secretary McElroy. No. As I said here earlier this morning, when we were talking about Regulus II, it is a fine weapon.

It has been phased out only because a finer weapon appears definitely to be achievable within a relatively few months, and I mean only a few months of the availability of the Regulus II.

Senator Cannon. Would you care to comment on the approximate number of months?

Secretary McElroy. I would say 4 or 5, something of that sort.

Senator Cannon. Thank you very much. No further questions.

Senator Stennis. The Chair recognizes Senator Case of South Dakota for 5 minutes.

Senator Case of South Dakota. Mr. Chairman, I should like to direct my first one or two questions, if I could, to General Twining.

Senator Stennis. Examination of General Twining is to come later, Senator Case.

Secretary McElroy must leave for a conference at the White House, and there are others here that want to question the Secretary.

Secretary McElroy. Mr. Chairman, this discussion this afternoon with the President also requires the presence of General Twining.

The schedule that we had indicated that General Twining and I would both be available for such a conference this afternoon, and it is a very pressing one, sir.

Senator Stennis. The Chair has no objection except, Senator Case, there are other Senators here who are waiting to question the Secretary, and if you want to use that time right away, go right ahead.

All right, Senator Case.

Senator Case of South Dakota. General Twining, as a military man, do you feel that you can measure our ability to deliver nuclear missiles intercontinentally today by a single weapon, or by considering the entire military team?

General Twining. We have an entire gamut of weapons. We use a mix of weapons to carry out our nuclear retaliation.

Senator Case of South Dakota. With your background and experience, and your access to knowledge as head of the Joint Chiefs of Staff, would you prefer to have our military posture today or that of Soviet Russia, considering the defense problems of the United States?

OUR DEFENSE POSTURE AND CAPABILITIES PREFERRED TO RUSSIA'S

General Twining. I would much rather have the defense posture and the capabilities of the United States than that which the Soviet is facing today.

Senator Case of South Dakota. Now I should like to direct the next question to Secretary McElroy. Mr. Secretary, is it your considered judgment that for the interim before the ICBM becomes fully operational in quantity, that our retaliatory ability is superior today to the Russian attack capability?

Secretary McElroy. My answer is affirmative.

Senator Case of South Dakota. Do we have manned jet bombers today with greater speed and delivery ability than the Snark and the Regulus, which of course were unmanned missiles?

Secretary McElroy. The B–52 has greater capability than the Snark, but the Snark has a greater speed than the B–52.

The B–52 is the best heavy bomber that we have at the present time.

Senator Case of South Dakota. Do any of the carrier-based aircraft which can carry nuclear weapons have a speed superior to Regulus?

Secretary McElroy. No.

Senator Case of South Dakota. Why was Cooke Air Force Base, now renamed Vandenberg, selected for the first operational base and training crew station for the ICBM's?

Secretary McElroy. The principal advantage of having the base located on the coast is that you have the water of the Pacific into which you can fire your training missiles.

Senator Case of South Dakota. Does the production plant which is producing Atlas share whatever vulnerability the Vandenberg field may have to submarine attack?

Secretary McElroy. Yes, it is close to the coast.

However, this makes it more vulnerable than an inland location only to the extent that for a relatively brief period of time you might assume that the Russians would have a short-range air breathing missile capability from surface submarines before they would have ICBM's.

Senator Case of South Dakota. Do you regard it as desirable that we have more than one plant engaged in the production of ICBM's, having in mind the vulnerability to whatever extent it may be of the——

Secretary McElroy. I would say it would be desirable, Senator Case, but your ability to make sense out of this would depend on the numbers that you are going to produce of a given generation.

Senator Case of South Dakota. Do you regard the missile launching capability of Soviet submarines as superior to what we now have in being?

Secretary McElroy. No, sir.

Senator Case of South Dakota. That is all.

Thank you, Mr. Chairman.

Senator Stennis. Senator Bush?

The Chair recognizes Senator Symington for the purpose of making a correction, after which he will recognize counsel for the committee.

SENATOR SYMINGTON CORRECTS ERROR IN STATEMENT AS TO EXPENDITURES

Senator Symington. Thank you, Mr. Chairman.

Mr. Secretary, I would like to correct a figure for the record.

When I said overall defense expenditures estimates had decreased $288 million compared with the fiscal year 1959, that was due to typographical error for which I am sorry. New obligational authority was decreased $288 million from fiscal year 1959 and the expenditures estimate increased $145 million from fiscal year 1959. I thank you for bringing that to my attention.

Secretary McElroy. Thank you, sir.

Senator Stennis. Senator Martin, you are recognized for 5 minutes.

Senator Martin. Mr. Secretary, in this field of rapid change and obsolescence, if you had to indicate which field you would emphasize

most, which would it be, the stockpiling of currently developed missiles or the research and development of more advanced missiles?

Secretary McElroy. Senator Martin, I do not believe that you can choose between those.

You must do both. You must maintain a current capability at the best level—at the level required for your defense and in the case of the weapons we are talking about a deterrence of general war—at the same time as you are proceeding under forced draft with the research and development of successive generations of the same type of weapons.

I do not believe you can choose, sir.

Senator Martin. That is all the questions I have.

Senator Stennis. Thank you, Senator.

The Chair will recognize for 10 minutes Mr. Weisl, the committee counsel.

Mr. Weisl. Mr. Secretary, just a few questions on SAC. Are we delivering any more planes per month, B–52's to SAC, than we were delivering a year ago or 2 years ago?

Secretary McElroy. This is the same as a year ago.

Mr. Weisl. Isn't the delivery per month about equal to the loss of B–52's through wear and tear and other losses?

Secretary McElroy. No. We are increasing the number of operational wings of B–52's.

Mr. Weisl. To a great extent?

Secretary McElroy. Well, a year ago we were thinking about 11 wings as our heavy bomber development; it is now 12, and as we are budgeting for 1960 the number that we will have, as those budgeted for 1960 come off the line, the number of wings would be about 14.

Mr. Weisl. Are we delivering any more tankers per month than we were?

Secretary McElroy. Would you like that submitted for the record?

Mr. Weisl. Yes, sir.

(The information referred to is as follows:)

KC–135 acceptances during fiscal year 1959 will be approximately twice those of fiscal year 1958.

Secretary McElroy. It is about the same range. We think it is a little more, but let's submit it for the record.

Mr. Weisl. The same as a year ago?

Secretary McElroy. Yes, sir.

Mr. Weisl. For SAC to be effective as a retaliatory force, it must have a warning system.

Secretary McElroy. Yes, sir.

WE ARE MOVING FAST TO CREATE A WARNING SYSTEM AGAINST BALLISTIC MISSILES

Mr. Weisl. Have we any warning system against the coming of ballistic missiles?

Secretary McElroy. We do not have an operational warning system against ballistic missiles, but we are moving very fast in the creation of one. This involves three locations. The first one is in Thule, Greenland. This is moving forward exactly on schedule, if anything slightly ahead of schedule. The second one will be in Alaska. The same thing can be said about it.

The third one, which is somewhat less important, but nevertheless is important to give us the completeness that we wish, would be someplace in the general area of northern Great Britain. That one has not yet been started, but is financed by funds in the 1960 program of the Department of Defense.

Mr. WEISL. Just one or two questions on limited war, Mr. Secretary.

On January 4, 1959, General Ridgway, who was former Chief of Staff of the U.S. Army and succeeded General MacArthur in command of the Korean Army, made this statement:

> We have some forces with the requisite degree of readiness to move quickly to meet one very small war or one limited war, you might say. The basic question in my mind is in view of our worldwide commitments to allies who ring the earth, do we have a ready force of adequate strength, of instant readiness and the transportation to move it quickly when the alarm bell rings? My answer to that question is an emphatic "No."

Do you agree with that statement of General Ridgway's?

Secretary MCELROY. No; I do not agree with the statement of General Ridgway. Of course, in order to understand what General Ridgway was referring to, it would be necessary to ask him specifically what kind of limited war he is talking about. If he considers Korea, that type of action, to be a limited war, then I can understand very well what he is saying. We do not consider that Korea is a limited war. We consider that if you had Korea again, you probably would handle things somewhat differently.

The kind of thing that we consider a limited engagement is the kind of thing which we have had in Lebanon and in Taiwan.

So that for the response to situations of that kind and situations somewhat comparable to that that we can visualize around the world, where we have commitments, we consider that our limited war capability is adequate.

Mr. WEISL. Would that apply to more than limited wars in Taiwan and Lebanon?

Secretary MCELROY. If you had——

Mr. WEISL. At one time?

Secretary MCELROY. If you had 8 or 10 of them at one time, I do not think we could meet such a situation. We are not assuming we will have 8 or 10 at one time.

If you did have 8 or 10 at one time, you would certainly mobilize your entire country, and really be prepared for general war.

Mr. WEISL. Suppose you had three at one time?

Secretary MCELROY. That, again, might require some mobilization or it might not, depending on the sizes.

Mr. WEISL. Do we have a plan of mobilization?

Secretary MCELROY. Yes, sir.

Mr. WEISL. Do we have to equip a mobilized Army quickly?

Secretary MCELROY. We have reserve stocks which are adequate for what we consider is likely to be required.

Mr. WEISL. The testimony of both General Taylor and General Gavin in our last hearings was to the effect that the Russian Army has been completely modernized; it has modern tanks, modern artillery, modern rockets, modern missiles, modern guns, and that it can outrange and outgun ours; that our equipment in the main has not been modernized.

Is that condition still true?

ARMY CHIEF QUOTED AS DISSATISFIED WITH MODERNIZATION

Secretary McElroy. I do not concede that it was true then, except again you would have to do this in very specific terms as to just what you meant.

If you mean is every tank one that is equivalent to the highest developed tank that your engineering people created yesterday, it is correct that we do not have a fully modernized Army force. Moreover, it is a fact that the modernization of the Army forces is not considered adequate by the Chief of the Staff of the Army.

But this comes into the same category of desires on the part of each individual service to be just as modern and capable as he can be with his forces, which is something to be encouraged, but which cannot within the resources available to the country be continuously done for everything.

Mr. Weisl. Isn't it true that the equipment of our Army in the main consists of Korean and pre-Korean equipment?

Secretary McElroy. No.

The money that we have spent since, of course, could be for Korean models, and that is the kind of thing which is rather steadily reported by the Army in discussing these matters. But the question of whether they are Korean models or post-Korean models depends entirely on the creation of new models by the Army to be superior to the Korean models.

And in that particular area of equipment, you do not have the fast evolution that you do in things like missiles.

Mr. Weisl. Do we have an equivalent in equipment of what the Russian army has?

Secretary McElroy. I would think in certain segments of our equipment, probably not. In most segments, in the significant segments, I would think that we did.

Mr. Weisl. Have we got an equivalent in tanks?

Secretary McElroy. When you get down to this kind of specifics, I have got to bow out, but I would like to say this, Mr. Counsel: The people of the country should realize that if we are going to fight Russia, we are not going to fight them on the ground in the main. There will be some conflict on the ground, but general war is the only kind of war that we visualize fighting with Russia.

Mr. Weisl. Yes, but we might fight other countries equipped with Russian equipment.

Secretary McElroy. We might.

Mr. Weisl. The point I ask is whether our equipment is the equal of the Russian type of equipment that might be supplied.

Secretary McElroy. We consider that it would be.

Mr. Weisl. What does the current budget do to Marine capability?

Secretary McElroy. I didn't hear that question.

Mr. Weisl. What does the present budget do to the capability of the U.S. Marine Corps?

Secretary McElroy. The Marines will have the same numbers and I would say the same gradual improvement in weapons in 1960 that they have as of the end of 1959.

SECRETARY DISAGREES WITH ARMY CHIEF ON AMOUNT NEEDED FOR MODERNIZATION

Mr. WEISL. When General Taylor made the public statement a few weeks ago that he needed $15 billion over a period of 5 years to modernize the Army, did you agree with that statement?

Secretary MCELROY. I do not agree that he requires it. I agree that it would be the kind of thing that could be used.

Mr. WEISL. But you do not believe he requires it?

Secretary MCELROY. No.

Senator STENNIS. I believe that the acting chairman's name is next on the list. I will take only a very few minutes.

Mr. Secretary, I have had the privilege of hearing all of the very fine briefings in the last 2 weeks by you and General Twining and then by the Secretarys and the Chiefs of Staff of the respective services, and I am not complaining here now about the total amount of your military budget. But there was one thing that was so glaring and stood out like a sore thumb to me that I thought it ought to be emphasized to you.

That is that in this reduction in manpower, it even went so far, or at least was carried out in such a way, as to actually reduce the numbers of the Marine battalions, the landing teams, the fighting forces, the actual combat forces, and also the same thing happened with reference to the actual frontline fighting battalions of the Army.

I am impressed with these worldwide commitments that we have in which we guarantee the territorial integrity of many many nations all around the globe. I believe that real shooting trouble, if it comes, will come in those places.

Very respectfully it seems to me that it would be your duty to reconsider that matter, and if there is not enough money in the present budget to implement or continue to keep those fighting battalions, that you should either try to get more money in the proper procedure, of course, or use some that is in this normal budget for other items. That is just a layman's opinion, but it is based upon a complete briefing by all of you gentlemen.

Have you had a chance since you appeared before our Armed Services Committee to get into that or further consider it or reconsider it?

REDUCTION IN ARMY DOES NOT MEAN SACRIFICE OF EQUITABLE CAPABILITY

Secretary MCELROY. Equally respectfully, Mr. Chairman, may I say that we do take seriously the points of view expressed by the members of this committee.

I would like to point out a few things in connection with this decision, just so that it may be understood by all of the members in relation to facts that I think are pertinent.

There has been a major improvement in the quality of the members of the Army forces in the last year, and what I am about to say is relative to a point that I want to make: that in my opinion a reduction of approximately 3 percent in the total number of individuals in the Army does not mean a reduction of that percentage or anything like it in capability.

My own belief is that the quality of the Army personnel has been so markedly improved in the last year, and will be in the year to come, that the excess above that 3 percent will be quite substantial.

I refer here to two things. One of them is to the new pay bill which was presented to this committee on the basis that there would be a reduction in turnover, that the Army and all the services would become a much more professional type Army, with the result that there could be a reduction in the training establishment, and a general upgrading of the numbers, of the percentage of all of our forces that would be in the combat area as distinct from the training and support areas.

That improvement in the pay bill and the application of proficiency pay, with which I know you are especially familiar, Mr. Chairman, was one of the factors that I am talking about.

The other one, which again was the result of some legislation that was passed last year by this committee, has to do with the withdrawal of the requirement on the Army in the application of the selective service procedures to take a rather high proportion of individuals into the service who are of the lowest mental capacity grades.

Significant of the improvement in this respect that has been made, Mr. Chairman, is the fact that there have been three disciplinary barracks closed, with all that that means in terms of removing the necessity of applying good prospective combat troops to guard such people, and also the people themselves are available for combat.

But even beyond that, which I mentioned to your committee the other day, I find that we have been able to close four or five schools which the Army had operated simply for the purpose of teaching such fundmental things as reading and writing and just the simplest kind of numbers to the lower grade of personnel coming into the Army.

So I think this is an honest statement, Mr. Chairman: that there has been, in the past year, a very marked improvement in quality of the Army. This is much more true of the Army, sir, than it would be of the others, because the others have been receiving their people by voluntary enlistment, the Army having its forces a combination of voluntary enlistment and the Selective Service Act.

Senator STENNIS. These improvement factors are very good and encouraging, but it sounds to me like you are giving that as a reason for reducing these fighting forces on the frontline, the frontline of attack.

It seems to me that the reasons you give are additional reasons why you should be able to keep those fighting forces out there on that frontline intact and not have to reduce them.

You have lessened expense elsewhere. You don't have the training program requirements that you had. It looks to me as though you could absorb whatever reduction you had to take in the training regiments or the training groups and other groups, and keep intact these men that carry the rifles.

Secretary MCELROY. I think my job, Mr. Chairman, is to work with the Army now to reestablish these combat competencies.

Senator STENNIS. Yes. That is what I was suggesting, that you reconsider this matter, and certainly reconsider it to the extent of seeing if you could not absorb that reduction somewhere else rather than at these very critical points.

NUMBERS ARE ADEQUATE CONSIDERING IMPROVED PROFESSIONALIZATION

Secretary McElroy. We do think that the numbers that are in both of these services are adequate considering the improved professionalization of the quality of the forces.

I admit your point, sir, that when you do come down in numbers of combat divisions, that does not seem to be what has happened. As I say, I think my job under the circumstances is to work with the Army toward a better use of the forces that they have, in order to get a greater proportion into the combat units, and I think we will be working toward that.

Senator Stennis. Do you mean that you are going to reconsider this matter to that extent and go into this very point again?

Secretary McElroy. I think just to be certain that you and I understand each other, Mr. Chairman, my own thought is that working within the figure of 870,000, I am going to try to work with the Army to see whether we cannot make a combat force which is equivalent of what we had with the 900,000 total, but with a lower grade quality overall.

Senator Stennis. That is just my point: That you go back into that and not permit those front line reductions to happen. I think I have about used my time and time is growing short, so I will waive the rest if I have any.

Senator Symington.

Senator Symington. Mr. Secretary, I would like to ask you a question about missiles.

Even with the now recently downgraded figure of Russian missile capability, do you know of any justification for stating or implying that we are planning any long-range missile production which would close the missile gap?

Secretary McElroy. It is not our intention or policy to try to match missile for missile in the ICBM category of the Russian capability in the next couple of years.

Our position, Mr. Symington, is that our diversified capability to deliver the big weapon is what we are going to count on as our ability to deter general war.

Senator Symington. What you are in effect saying is that we are planning in this fashion in spite of our intelligence estimates that the Russians are going to produce a great many more missles, ICBM's, than we are; is that correct?

OUR PLAN ENVISAGES RUSSIAN ICBM SUPERIORITY IN NUMBERS

Secretary McElroy. We are planning based on an assumption that they have that capablity, and if they use that capability—and we are also assuming that they will from the standpoint of our counterforce—then they will have a year from now, 2 years from now, a larger number of this particular element in the retaliatory force than the United States will have.

Senator Symington. I want to thank you very much for your fair and frank answer. I have a statement here which you made in a classified hearing. I wonder if you would be willing to declassify this statement for this hearing.

Senator McElroy. Declassify it?

Senator SYMINGTON. Will you read it into the record? It is my only copy.

Secretary MCELROY. I have said this before and I am very glad to say it here.

Senator SYMINGTON. I think you almost said it again just a minute ago, but I just want to be sure.

Secretary MCELROY. I think it would be very dangerous if we did not proceed on this basis. What I am reading—and I have no idea exactly where I said this, but I am sure that you have taken it out of a record——

Senator SYMINGTON. My assistant took it out of the record of your testimony last week before the Armed Services Committee.

Secretary MCELROY. I got confused, as anybody else does, about where I have been most recently.

Senator SYMINGTON. My staff assistant says it was last Wednesday.

Secretary MCELROY. This is the statement:

I would like to make a final comment because I think that it should be understood that from the standpoint of the Department of Defense we are assuming, as I think we should assume, that they—

meaning the opponent—

will have these numbers in being at the times when the national intelligence estimates say they could have it.

I think that is the way in which I would say it to this group, and would not hesitate to say it anywhere.

Senator SYMINGTON. Thank you very much, Mr. Secretary. I felt that was your position, and I wanted to be sure, inasmuch as you said it in a classified hearing, that I had your approval in making it a part of this record.

Secretary MCELROY. Thank you for that courtesy, sir.

Senator SYMINGTON. I have no further questions.

Senator STENNIS. The Chair is calling the membership here according to the prepared list and skipping the names that are not here. Mrs. Smith?

Senator SMITH. Mr. Chairman, I have an observation that I would like the Secretary's appraisal on and comments.

Mr. Secretary, it has been observed that the principal difference between the United States and Russia is that while Rusia is concentrating on a missile program, the United States is dividing its efforts and resources between a continuation of a heavy bomber program and a less concentrated missile program than Russia has.

A further part of this observation has been that both Russia and the United States were taking calculated risks. The Russians risk being that our heavy bombers would not attack Russia prior to her attaining missile superiority of such magnitude that we could not catch up with her. The U.S. risk being that heavy bombers are our insurance against Russian attack for 3 to 5 years, and the hope that by the end of that period we will have attained such missile strength in the divided program that it will so closely approach that of Russia that a stalemate or a balance of missile power will have developed, thus preventing each side from starting a war.

Is that observation accurate and valid?

Secretary McElroy. I don't think that is far from the fact. I would like to say that, like any statement which is as brief as that, it leaves out a lot of things, such as, for example, the existence of a Polaris capability to reinforce the bomber capability at the time when we think that the Russian will be developing a rather important ICBM capability.

ACCELERATED DEVELOPMENT OF MINUTEMAN GREATLY DESIRED

It also does not quite say what I think, but it is implicit in there, that the Minuteman concept of the ICBM is so very much superior to the liquid fuel ICBM that an accelerated development of a Minuteman capability is a succession to the liquid propelled missiles, which is something very much to be waited for, unless you are exposed during the waiting time.

Our opinion in this Defense Department is that we are not exposed as long as we maintain the combination of diversified capabilities to deliver the big weapons that we will have between now and the time when we will have a substantial Minuteman capability.

Senator Smith. Does it in any related way explain our policy of ringing Russia with IRBM bases?

Secretary McElroy. You say does it?

Senator Smith. Does it, yes, in any related way?

Secretary McElroy. We think of the IRBM bases on the property of our allies as an important reinforcing part of the deterrent, along with the other things, such as the heavy bombers, the attack bombers, and the Polaris and the Regulus I on those subs that have them and so on.

Senator Smith. Thank you very much, Mr. Chairman.

Senator Stennis. I thank you, Senator Smith. Senator Martin?

Senator Martin. This last statement of yours is a very good answer to my previous question about your stress on the development of new and more advanced ballistic missiles.

I do not know whether the answer to this next question is classified or not. Are you handicapped today in any way by the shortage of the raw materials, the strategic materials needed in this field of ballistic missile development?

Secretary McElroy. I am not aware of any, Senator Martin, but I would like to explore that question with the Department, and may I file the statement on that for the record?

Senator Martin. Yes.

Secretary McElroy. Dr. York will be up here, and he would have intimate knowledge of this.

I suspect that at all times as we get into the areas of exotic materials where there is almost no production, that there are times during which you are generating a production capacity of those exotic materials and probably have a period of shortage, but I am just not close enough to it to be able to be specific.

Senator Martin. The ballistic missile development must be a very real part of the planning of the stockpile program I should think.

Secretary McElroy. It has to be, yes, sir.

Senator Martin. The stockpile of strategic and critical materials.

Secretary McElroy. Oh yes, sir.

(The material referred to is as follows:)

For the present and foreseeable future there are no shortages of raw or strategic materials which will handicap the development and production of ballistic missiles. To prevent any shortages of raw or strategic materials the Department of Defense continuously studies all of the important materials that are required for the development and production of our important weapons systems. Based on these studies, a report is submitted to the Office of Civil and Defense Mobilization every 6 months. The purpose of this report is to furnish an authoritative, timely forewarning of strategically important, new military uses of materials that appear to be potentially of sufficient magnitude as to raise questions concerning adequacy of supply of these materials to the United States. The preparation and submission of these reports every 6 months will assure a regular review of the national status of each such material at intervals short enough to minimize the possibility of the development of acute and awkward shortages resulting from any advances in weaponry or supporting technology.

Senator MARTIN. That is all.

Senator STENNIS. Senator Anderson?

Senator ANDERSON. No more questions.

Senator STENNIS. Senator Case of New Jersey?

Senator CASE of New Jersey. No further questions.

Senator STENNIS. Senator Cannon?

WE DO NOT ASSUME RUSSIA IS AHEAD IN MISSILES

Senator CANNON. Mr. Secretary, you assume then that Russia is now ahead of us in missiles?

Secretary MCELROY. No, we do not assume that as of now.

Senator CANNON. You do not as of this time?

Secretary MCELROY. No, sir.

Senator CANNON. And you consider that fact then when you say that you are developing both in the bomber field and in the missile field?

Secretary MCELROY. Yes. We consider the timing of the intelligence as well as the amounts credited to them as capabilities.

Senator CANNON. From your answer to Senator Symington's question, I take it that you assume Russia will catch up with us in the not too distant future?

Secretary MCELROY. We think that if they use the capabilities that we grant them in our intelligence, they will catch up with us.

Senator CANNON. And how soon will that be?

Secretary MCELROY. I would like to handle that in executive session, sir.

Senator CANNON. And you do not feel it necessary that our program be such that we keep ahead of them in the missile field?

Secretary MCELROY. As I have said, Senator, our policy is to accumulate our strength in the ways which are most favorable from our particular position, and that decision means that if the Russians proceed to use their capabilities, we under our program will have fewer ICBM's at a certain time down the road than they have.

Senator CANNON. And at that point will the number of ICBM's that we have, in your opinion, be such as to deter attack?

Secretary MCELROY. The number of ICBM's that we have at that time in combination with the other elements of our strategic delivery force we consider to be adequate to deter attack.

Senator CANNON. Nothing further.

Senator STENNIS. Senator Case of South Dakota?

Senator CASE of South Dakota. Mr. Chairman, this line of questioning reminds me of an illustration, Mr. Secretary, and I will suggest that you comment on it.

I have been proceeding under the belief that the immediate problem of the United States is to maintain a retaliatory capability that would operate as an adequate deterrent in a cold war and an assurance of victory if we got into a hot war. So I have thought that the true measure of our relative position was not merely what we might have in a particular weapon, but that in the term that General Twining used, a mix of weapons, so that we can have a superiority in ability and dependability to deliver a greater number of weapons with a nuclear warhead.

On that basis of our relative ability, do you feel that we have a greater ability, a dependable ability, to deliver a greater number of warheads at the present time, and we will have that for the next year or so?

M'ELROY BELIEVES OUR SUPERIORITY WILL CONTINUE

Secretary MCELROY. I believe that we do have it at the present time, and I do believe that we will have it for the next year or so.

Senator CASE of South Dakota. If I were managing the Washington baseball team I might make several improvements, but it seems to me that I would rather have one Roy Sievers than four Killebrews. I do not know whether you are familiar with it or not, but Mr. Killebrew hits a home run once in awhile, but he also strikes out, and if you are going to win ball games you have got to get the runs across the plate.

Do you think it is better to have a team with an occasional home-run hitter who strikes out more often than he hits home runs, or to have a team that gets occasional home runs, with many others on the team who can occasionally deliver a two-bagger or a three-bagger and get more total runs across?

Secretary MCELROY. This gets me out of my field. [Laughter.]

Senator CASE of South Dakota. I just don't know how to translate this into soap production. [Laughter.]

Secretary MCELROY. And I am not sure that I get the parallel. I think maybe I had better retire from that question to executive session.

Senator CASE of South Dakota. Let's take something else. I want to support or second what the Chair has said here expressing a hope that you will give some further consideration to the possible impairment of the strength of the Marines. I know you are a busy man and it is difficult perhaps for you to find the time to sandwich in consideration of some of these matters between your appearances before congressional committees.

But the Marine Corps is organized on a different basis than the Army. The divisions carry their own support strength with them. It is necessary it seems to me for them to have a different strength per division than what is in the Army, and I hope you will give that some consideration.

Secretary MCELROY. We will. I would like to say with respect to the Marines, no one who is ever Secretary of Defense is going to be very long unaware of the importance of the Marines. I have had

recent discussions with the Marines on the very point you raise, because I wanted to know what the facts were about their improvement in reenlistments and the improvement in their professionalization of the Marines as a force—and they have been a rather professional force for quite a period of time.

MARINE CAPABILITY OVERALL SEEN AS IMPROVED

As you may already know, Senator Case and Mr. Chairman and others of the committee, their reenlistments have improved measurably. Moreover the reenlistments in the 4-year category as distinct from the shorter category have been increasing, so that there are things in this area too which have been improving the quality of the Marine force overall, and should be taken into consideration as we approach this question. I know we will certainly approach the question receptively just as you have requested it.

Senator CASE of South Dakota. I appreciate that. Mr. Secretary, incidentally having in mind the problem you have of time this afternoon, and considering some of the suggestions that have been made, How much time have you spent before congressional committees in the last 3 weeks since Congress has been in session?

Secretary MCELROY. I don't think I could quite add it up for the 3 weeks, but I would say this week I have been before committees every morning and every afternoon, Senator.

Senator CASE of South Dakota. What is your schedule in that respect for the next 3 weeks?

Secretary MCELROY. This of course is the time of most intensive committee hearings. I think this runs pretty steadily through next week the same way.

Senator CASE of South Dakota. Just in conclusion, Mr. Secretary——

Secretary MCELROY. For example, the National Security Council is meeting this morning, and I am not there.

Senator CASE of South Dakota. In view of the fact that I referred to your prior experience, I should like to say for myself and I think for many members of the committee, that we have been pleased and delighted by the way in which you have shown that you could take your native intelligence and apply it to this tremendously complex problem that we have in national defense.

Your answers before the committees have been candid. You have been reassuring by your willingness to say you did not know if you did not, but we have also been reassured by the many many times in which you have been able to give specific answers, and by the comprehensive character of the approach to the whole defense problem.

Secretary MCELROY. Thank you very much, Senator.

Senator STENNIS. If the committee will indulge me just 20 seconds, I just want to emphasize that my references, Mr. Secretary, were not to the Army and the Marines as an organization, as a unit. It is simply to that fighting force, the combat-ready troops, the combat battalions wherever they are found. That is my concern in reference to so-called limited wars and the deterrent trouble spots wherever they may be.

Do other members of the committee have questions? Counsel has a question. Senator Anderson, you passed a while ago.

SENATOR ANDERSON SEEKS INCREASED EMPHASIS ON NUCLEAR PROPULSION

Senator ANDERSON. May I say, Mr. Secretary, I did not question you about dropping these missiles because I have been one person who has been saying we have too many missiles and they ought to be cut down, and I could not consistently criticize you for trying to do it.

I do say that there are many of us who hope that there will be increased emphasis on the nuclear propulsion of these great devices.

It is true that the Government owns about all the nuclear material, and it has no lobbyist down here to plead for nuclear development. It would be worthwhile to get these things into the air and keep them flying, and my only hope is that in future budgets we may have what I regard and what other people regard as sufficient money in what I think is a most promising field of propulsion.

Secretary McELROY. Thank you, Senator.

Senator STENNIS. Thank you, Senator. Counsel has a question. Mr. Weisl.

Mr. WEISL. Mr. Secretary, in fairness to you, because I think I know what other witnesses will testify to, in answer to Senator Cannon's question as to whether we are ahead overall in missiles at the present time, you said that we were. Did I understand you correctly?

Secretary McELROY. I thought he asked the question as to whether we thought the Russian was ahead of us in ICBM's at the present time. Is that not the question?

Mr. WEISL. He is not here.

Secretary McELROY. Was that not the question?

Mr. WEISL. Are we ahead in ICBM's?

Secretary McELROY. No.

Mr. WEISL. At the present time?

Secretary McELROY. We do not think we are ahead. Neither do we think he is ahead at this time.

Mr. WEISL. Last year the testimony of most of the witnesses was that in the intermediate missile field they then had—that was 15 months ago—intermediate missiles in quantity of sufficient range to knock out all our airbases, with the exception of Spain and Morocco. Now we must assume that they haven't stood still since that time.

Secretary McELROY. I was talking, and this was the question as understood by me, specifically about the intercontinental ballistic missile.

Mr. WEISL. You were limiting it to the ICBM?

Secretary McELROY. Absolutely. We concede that he has substantial capability operational now with the 700-mile missile.

Mr. WEISL. I see. Thank you very much.

Senator STENNIS. Senator Symington.

Senator SYMINGTON. I would like to be cleared up on this, too, Mr. Secretary. Do you feel at this time, based on our intelligence, that we are even with the Russians in the ICBM field?

Secretary McELROY. We have no evidence that he is further along than we are. We know that he has fired test missiles. I say we know it—we think he has fired test missiles earlier than we did, because we think that that would probably go along with his known satellite capability.

But there is nothing in our intelligence that indicates that operationally he is ahead of us at this point.

Senator SYMINGTON. If we believe that they will very soon have more ICBM's than we have and plan to have, does that imply that they are ahead of us instead of our being even with them?

DOWN THE ROAD THEIR ICBM NUMBERS WILL BE GREATER

Secretary MCELROY. Not if neither one of us has yet started to have an operational capability.

You see in the initial period, if we are starting on about the same time period—and my belief is from the intelligence guidance that I have that that will be approximately true—then the question is not the initial timing but what goes on down the road. And as I have said, down the road we expect him to have the capability to do more than we intend under our programing to do for ourselves in the strictly ICBM area.

Senator SYMINGTON. Then as I understand it your position is that we are voluntarily passing over to the Russians production superiority in the ICBM missile field because we believe that our capacity to retaliate with other weapons is sufficient to permit them that advantage despite the great damage that we know we would suffer if they instigated an attack?

Secretary MCELROY. I would like to modify the expression a little bit, but it won't be very much different from what you have said.

I take the more positive point that we are using our ICBM capacity to the extent that we consider best in our own interests to combine with our other strategic delivery systems to provide a deterrent to the Russian capability looking 1 or 2 years ahead.

Senator SYMINGTON. Would you consider if the question of money was not important that nevertheless we would not want to build any more ICBM's or expand plant capacity to build any more?

Secretary MCELROY. I think that if the question of money was not important, we would want to look at various ways in which we might do this. In other words, it could be that we might conclude that more Polaris' would be better for our purposes than more ICBM's.

Senator SYMINGTON. Do you feel that we would want to look at the question of more hardening of our ICBM bases?

Secretary MCELROY. That one I definitely think we would want to do and are doing, Senator.

Senator SYMINGTON. I am very glad to hear that. And how about more dispersal of our ICBM retaliatory potential?

Secretary MCELROY. That one also we should do and are doing.

Senator SYMINGTON. Are there recent plans to that end?

Secretary MCELROY. We have had some recent information from a contractor that looks as if he can be very helpful in guiding us to improve hardening and improve dispersal without too much of a sacrifice in time.

Senator SYMINGTON. When will you make your decision on that matter?

Secretary MCELROY. I can't exactly say, but I would say just as quickly as we can get our deductions.

Senator SYMINGTON. In the next few weeks or months?

Secretary McElroy. Yes, sir. It is an important point. We are in full agreement with you on that, Senator.

Senator Symington. Thank you, Mr. Secretary.

Senator Stennis. Mr. Secretary, we certainly want to thank you for your testimony here this morning and your assurance, your time, you and your staff. We thank you too for your attendance and your testimony here, General Twining.

We are sorry we kept you gentlemen as late as we have, especially in view of your forthcoming appointment, but we have a long subject to go over. Unless there is objection by the committee, we will take a recess until 2.

(Thereupon, at 12:50 p.m., the subcommittee recessed to reconvene at 2 p.m. of the same day.)

AFTERNOON SESSION

Present: Senators Johnson (presiding), Stennis, Bartlett, Symington, Young, Dodd, Cannon, Case of South Dakota, Wiley, Martin, Case of New Jersey, and Lausche.

Senator Johnson. General White, Admiral Burke, General Pate, and members of the committee, this morning the committee heard Secretary McElroy, accompanied by General Twining. At that time Secretary McElroy said that the members of the Joint Chiefs signed a memo indicating their support of the defense budget. At the same time he said the United States was prepared to concede that Russia today had the edge in intermediate range missiles; in the next 2 years they would have an ever-increasing edge in the ICBM.

The purpose of these hearings is to get an account of what is happening to the Nation's preparedness program. We want to know from you gentlemen fully and frankly not only what you think of the existing program, but also everything that you might recommend for our future.

The survival of our Nation and the free world is at stake. In accordance with our normal policy, I want to ask each witness to be sworn. Will you please stand?

Do you solemnly swear that the evidence you will give to this committee on the inquiry now underway will be the truth, the whole truth, and nothing but the truth, so help you God?

Admiral Burke. I do.

General White. I do.

General Pate. I do.

TESTIMONY OF ADM. ARLEIGH BURKE, CHIEF OF NAVAL OPERATIONS; GEN. THOMAS D. WHITE, CHIEF OF STAFF, AIR FORCE; AND GEN. RANDOLPH McC. PATE, COMMANDANT, U.S. MARINE CORPS

(The biographies of Admiral Burke, General White, and General Pate are as follows:)

ADM. ARLEIGH A. BURKE, U.S. NAVY, CHIEF OF NAVAL OPERATIONS

Arleigh A. Burke was born far from the sea in Boulder, Colo., on October 19, 1901. On June 8, 1923, he was graduated from the U.S. Naval Academy, commissioned ensign in the U.S. Navy, and married to Miss Roberta Gorsuch of Washington, D.C.

Throughout his professional career, Arleigh Burke had prepared himself for combat with the enemy, having served in battleships, destroyers, and having received the degree of master of science and engineering at the University of Michigan. Then, when World War II came, he found himself, to his great disappointment, in a shore billet at the Naval Gun Factory in Washington, D.C. After persistent effort on his part, he received orders to the South Pacific where, under Admiral Halsey, he successively commanded Destroyer Division 43, Destroyer Division 44, Destroyer Squadron 12, and Destroyer Squadron 23. This latter squadron, known as the Little Beavers, covered the initial landings in Bougainville in November 1943 and fought in 22 separate engagements during the next 4 months. During this time the Little Beavers were credited with destroying 1 Japanese cruiser, 9 destroyers, 1 submarine, several smaller ships, and approximately 30 aircraft. Because he pushed his destroyers just under boiler-bursting speed, he became known as "31-Knot Burke."

From destroyer command in the South Pacific, he reported in March of 1944 as chief of staff to commander, Fast Carrier Task Force 58, Adm. Marc Mitscher. While serving with this famed carrier force, Arleigh Burke was promoted to commodore, and participated in all its naval engagements until June 1945 shortly before the surrender of Japan. He flew many combat missions. He was aboard both *Bunker Hill* and *Enterprise* when they were hit by Japanese suicide planes during the Okinawa campaign.

At the outbreak of the Korean war, Adm. Forrest Sherman, then CNO, ordered Admiral Burke to duty as deputy chief of staff to commander, Naval Forces, Far East. From there, he assumed command of Cruiser Division 5, and in July 1951 he was made a member of United Nations truce delegation to negotiate with the Communists for a military armistice in Korea. After 6 months in the truce tents, he returned to the Office of Chief of Naval Operations, where he served as Director of Strategic Plans Division until 1954.

In April 1954 he took command of Cruiser Division 6, and in January 1955 assumed command of Destroyer Force Atlantic Fleet in which capacity he served until he succeeded Adm. Robert B. Carney as Chief of Naval Operations in August 1955.

Admiral Burke has received numerous combat awards during his 37 years in the Navy including the Distinguished Service Medal, the Navy Cross, the Legion of Merit, and the Purple Heart. But none are more cherished than two awards which came early in his career. In 1928 while serving aboard the U.S.S. *Procyon*, he was commended for the "rescue of shipwrecked and seafaring men," and in 1939 while serving in his first command, U.S.S. *Mugford*, he was commended when his destroyer won the fleet gunnery trophy with the highest score that had been achieved in many years. His ship also stood third in engineering competition and high in communication competition.

Admiral Burke's current residence is Admiral's House, U.S. Naval Observatory, Washington, D.C.

GEN. THOMAS D. WHITE, CHIEF OF STAFF, U.S. AIR FORCE

Thomas Dresser White was born in Walker, Minn., on August 6, 1901. Upon graduation from the U.S. Military Academy on July 2, 1920, he was commissioned a second lieutenant of infantry and immediately promoted to first lieutenant.

Entering the Infantry School at Fort Benning, Ga., General White was graduated in July 1921 and assigned duty with the 14th Infantry at Fort Davis, Panama Canal Zone.

In September 1924 he entered Primary Flying School at Brooks Field, Tex. He was graduated from Advanced Flying School at Kelly Field, Tex., in September 1925 and assigned duty with the 99th Observation Squadron at Bolling Field, Washington, D.C.

In June of 1927, General White was assigned to duty as a student of the Chinese language in Peking, China. Four years later he returned to the United States for duty at Headquarters, Air Corps, Washington, D.C.

General White was named assistant military attaché for air to Russia in February 1934. A year later he was appointed assistant military attaché for air to Italy and Greece, with station at Rome, Italy.

General White was graduated from the Air Corps Tactical School at Maxwell Field, Ala., in May 1938. He then entered the Command and General Staff School at Fort Leavenworth. Upon completion of this training, he was assigned to the Office of the Chief of Air Corps, Washington, D.C.

In April 1940, General White became military attaché to Brazil and the following August was named Chief of the U.S. military air mission to Brazil.

Returning to the United States in March 1942, General White was appointed Assistant Chief of Staff for Operations of the 3d Air Force at Tampa, Fla., and subsequently named Chief of Staff.

Reassigned to Air Force Headquarters in January 1944, he became Assistant Chief of Air Staff for Intelligence.

Proceeding to the Southwest Pacific in September 1944, General White assumed duty as the deputy commander of the 13th Air Force, taking part in the New Guinea, southern Philippines, and Borneo campaigns. The following June he assumed command of the 7th Air Force in the Marianas and immediately moved with it to Okinawa. In January 1946 he returned with the 7th Air Force to Hawaii. That October he was appointed Chief of Staff of the Pacific Air Command in Tokyo, Japan. One year later, in October 1947, General White took command of the 5th Air Force in Japan.

Transferred to the Office of the Secretary of the Air Force in October 1948, General White became Director of Legislation and Liaison. He was appointed, in May 1950, Air Force member of the Joint Strategic Survey Committee in the Office of the Joint Chiefs of Staff. He was assigned as Director of Plans, Headquarters, U.S. Air Force, in February 1951 and in July 1951 assumed duties of Deputy Chief of Staff, Operations, for the Air Force.

General White was promoted to his present four-star rank of full general on June 30, 1953, and designated Vice Chief of Staff at that time, becoming Chief of Staff for the U.S. Air Force on July 1, 1957.

His decorations include the Distinguished Service Medal, Legion of Merit with one oak leaf cluster, and Air Medal with one oak leaf cluster. He is rated a command pilot, combat observer, aircraft observer and technical observer.

General White has one daughter, Rebecca Ann (Mrs. William Mitchell, Jr., of Boyce, Va.) He is married to the former Miss Constance Millicent Rowe.

Gen. Randolph McC. Pate, Commandant, USMC

Gen. Randolph McCall Pate, the 21st Commandant of the Marine Corps, is a veteran of the Korean fighting, World War II action at Guadalcanal and Iwo Jima, and pre-World War II expeditionary service in Santo Domingo and China. A marine officer since September 1921, he assumed his present duties and was promoted to his present rank January 1, 1956.

In Korea the general commanded the First Marine Division from June 15, 1953, to May 12, 1954, winning the Distinguished Service Medal and the Republic of Korea's Order of Military Merit Taiguk in that capacity.

In World War II Gen. Holland M. Smith, USMC (retired), awarded General Pate the Legion of Merit for outstanding service as Deputy Chief of Staff to the Commanding General, Fleet Marine Force, Pacific. Serving in that capacity from September 11, 1944, to November 1, 1945, he was cited in particular for his performance of duty during amphibious operations on Palau, Iwo Jima, and Okinawa. In 1947 Gen. Alexander A. Vandegrift, then Commandant of the Marine Corps, presented him a gold star in lieu of his second Legion of Merit. The award was for exceptionally meritorious service at Guadalcanal as Assistant Chief of Staff for Supply of the First Marine Division during the U.S. first offensive against Japan.

General Pate was born at Port Royal, S.C., on February 11, 1898. After a brief tour of enlisted service with the U.S. Army in 1918, he entered the Virginia Military Institute, graduating in June 1921, with a bachelor of arts degree. He was commissioned a second lieutenant in the Marine Corps Reserve that September.

In addition to expeditionary duty in Santo Domingo in 1923 and 1924 and in China from 1927 to 1929, General Pate saw service at various posts in the United States and Hawaii. In the spring of 1939, he joined the First Marine Division at New River (later Camp Lejeune), N.C., as Assistant Chief of Staff for Supply. He began his World War II service in this capacity, participating in the planning and combat phases of the Guadalcanal campaign, and later saw further service in the Pacific Area.

Returning to the United States after the war, the general was named Director of the Division of Reserve at Marine Corps Headquarters in January 1946. The

following year he assumed duties as a member of the General Board, Navy Department, Washington. In July 1948, he became Chief of Staff of the Marine Corps Schools, Quantico, Va., and 2 years later was named Director of the Marine Corps Educational Center.

In July 1951, General Pate was assigned to the Office of the Joint Chiefs of Staff, where he served as Deputy Director of the Joint Staff for Logistic Plans. He was named Director of the Marine Corps Reserve for a second time that November, and served in that capacity until September 1952, when he took command of the Second Marine Division at Camp Lejeune. Ordered to Korea in June 1953, he commanded the First Marine Division until May 1954. That July he was named Assistant Commandant of the Marine Corps and Chief of Staff, serving in that capacity with the rank of lieutenant general until he assumed his present duties.

In addition to the Distinguished Service Medal, Legion of Merit with Combat "V" and gold star in lieu of a second, and Order of Military Merit Taiguk, General Pate's medals and decorations include the Purple Heart (Guadalcanal, 1942); the Presidential Unit Citation (Guadalcanal, 1942); the Navy Unit Commendation (Korea, 1953); the World War I Victory Medal; the Marine Corps Expeditionary Medal with two bronze stars (Santo Domingo, 1923–24, and China, 1927–29); the Yangtze Service Medal (China, 1927); the American Defense Service Medal; the Asiatic-Pacific Campaign Medal with three bronze stars; the American Campaign Medal; the World War II Victory Medal; the National Defense Service Medal; the Korean Service Medal with one bronze star; the U.N. Service Medal; and the Korean Presidential Unit Citation Ribbon.

General Pate is married to the former Mary E. Bunting of Winnipeg, Canada, whom he met while stationed in San Diego, Calif.

Senator JOHNSON. Gentlemen, we appreciate your appearing before us.

Counsel, would you proceed with your examination?

Mr. WEISL. Admiral Burke, you signed a memorandum in which you stated, or which memorandum stated, that the Joint Chiefs of Staff consider the fiscal year 1960 proposed expenditure figure is adequate for the essential programs necessary for the defense of the Nation for the period under consideration; that you find no serious gaps in the key elements of the budget in its present form, but all have reservations with respect to funding of some segments of their respective service program.

When did you sign this memorandum?

Admiral BURKE. We signed the memorandum, the last time on the 19th of January. Before that we had signed a similar memorandum which had in it a different set of figures which did not affect the memorandum.

Mr. WEISL. Were the figures that you signed before the memorandum of the 19th of January higher or lower than the figures that you signed——

Admiral BURKE. They were higher, but they included figures which, strictly speaking, should not have been in the military budget.

Mr. WEISL. Why not?

Admiral BURKE. That is a very classified——

Senator JOHNSON. Very well.

Mr. WEISL. Was this memorandum signed on the same day that the budget message went to Congress?

Admiral BURKE. I am not sure, sir. It was on the 19th of January.

Mr. WEISL. Did you all sit down together and sign it?

Admiral BURKE. No, sir. The memorandum was sent around to our offices.

Mr. WEISL. How long did you, as a body, that is, the Joints Chiefs of Staff, have to consider the budget for all four services?

Admiral BURKE. I think the first time that we received the budget as Joint Chiefs was on the 4th of December. It may have been the 5th, but in that——

Mr. WEISL. Are you talking about the same budget that is in this memorandum?

Admiral BURKE. Yes, sir.

Mr. WEISL. In your judgment, was this time adequate to enable you to know what the program for the other services were, and how individual items compared as to the relative priority and necessity?

PROGRAMS OF OTHER SERVICES EXAMINED AS TO FUNCTION

Admiral BURKE. The Joint Chiefs of Staff do not go into great detail on the costing of the programs of the other services. Throughout the whole year we are examining various programs of the other services, not from a budgetary point of view, but from other points of view, that is, deployment and examinations of various types of weapons systems, but not from a budgetary point of view. So we have a general idea of what the other services have.

From my own point of view I have a great deal of difficulty in following the detailed work of the Joint Chiefs of Staff as it is now constituted, and the detailed work of my own service. It would be quite difficult for me to examine in detail either the Army or the Air Force budget.

Mr. WEISL. How can you tell that the overall budget was sufficient to defend this Nation if you don't know in detail what the requirements of the other services are?

Admiral BURKE. We know in general what the other services have and what their requirements are as far as weapons systems are concerned. But as far as pricing out those weapons systems is concerned, that is another matter.

Mr. WEISL. Did the Joint Chiefs as a body make any across-the-board review of the budget requests?

Admiral BURKE. You mean an examination in detail?

Mr. WEISL. Yes, sir.

Admiral BURKE. No, sir.

Mr. WEISL. Why not?

Admiral BURKE. There was not time enough, sir.

Mr. WEISL. How can you tell the Congress this budget is sufficient overall, for all services to protect the Nation, if you don't examine in detail the requirements of each of the services?

Admiral BURKE. We sit for many hours at many conferences on our own budget with the Secretary of Defense, and with our own people. Also we sit during the same period with the Joint Chiefs of Staff on many other subjects. There is a great deal of work to be done. We, the Joint Chiefs, cannot be expected to go into the budget of all the services in great detail to determine the relative priorities of the other services.

Mr. WEISL. But that isn't what you signed.

Admiral BURKE. Yes, sir.

Mr. WEISL. You signed a memorandum saying that this figure is adequate to provide for the essential programs for the defense of the Nation.

How can you say that, if you don't know what the requirements of the other services are?

Admiral BURKE. It is not the requirements that the other services submit, but the programs which make up this budget as a whole. The programs that are in that budget, I think, are adequate for the defense of this country.

Mr. WEISL. How can you say that if you don't know what the requirements of the other services are?

EXAMINATION OF PROGRAMS OF OTHER SERVICES SUFFICIENT

Admiral BURKE. Because we have examined their programs—not their requirements—the programs that have been submitted.

Mr. WEISL. Have each of the members of the Joint Chiefs told you that the provision for those programs is adequate?

Admiral BURKE. Otherwise, the Joint Chiefs would not have signed that memorandum. Yes, sir.

Mr. WEISL. They have told you that?

Admiral BURKE. They signed the same memorandum, sir.

Mr. WEISL. Have they told you that?

Admiral BURKE. No, sir; if they signed the memorandum, I wouldn't require them to tell me that in addition, sir.

Mr. WEISL. Did they have reservations as to the adequacy of the budget for their individual requirements?

Admiral BURKE. Yes, sir; each Chief had reservations.

Mr. WEISL. What reservations did you have?

Admiral BURKE. The reservations are quite detailed, sir, and I would like to submit those for the record, if I might.

Mr. WEISL. Will you cover them generally for the committee?

Admiral BURKE. Yes, sir.

In my own service I have reservations on the material condition of the fleet.

Mr. WEISL. As I read your statement issued a few days ago, you pointed out that your most pressing problem in immediate readiness, in immediate readiness, is the material condition of the fleet:

> Eighty-one percent of our active fleet is of World War II construction. These ships have been operated at a fast pace for many years. They are wearing out. The useful life of naval ships is about 20 years. Our World War II ships will therefore become largely obsolescent between 1961 and 1965.

Does this budget provide for the modernization of that obsolescent fleet?

Admiral BURKE. This budget provides for a real good modernization of 8 ships, and a thorough overhaul, of 26 ships, in addition to the shipbuilding program.

Mr. WEISL. What percentage is that of the obsolescent fleet?

Admiral BURKE. About 2 percent, sir.

Mr. WEISL. About what?

Admiral BURKE. Two percent, sir.

Mr. WEISL. And 81 percent are obsolescent?

Admiral BURKE. Yes, sir; will be.

Mr. WEISL. And 2 percent are being made modern?

Admiral BURKE. Yes, sir.

(NOTE.—Admiral Burke subsequently requested that this figure should be 5 percent in lieu of 2 percent.)

Mr. WEISL. You consider that budget sufficient to meet that requirement?

Admiral BURKE. I consider the budget as submitted, will not endanger the country, sir.

Mr. WEISL. Well, but don't you base the requirements in the Navy on the basis of what will or will not endanger the country?

Admiral BURKE. Yes, sir.

Mr. WEISL. If you do, then why don't you ask for a greater modernization of the fleet than 2 percent?

WE WILL RUN INTO TROURLE UNLESS WE DO SOMETHING

Admiral BURKE. Because the fleet can operate this year. But we are going to run into very serious trouble in a few years unless we do something about it. We are going into this modernization program. We will get as much value as we possibly can out of these old ships by extending their useful life a few years. As I said in that statement, too—our shipbuilding rate is slow, and someday we are going to have to correct that, or we are not going to have in the future the capability that we now have.

Mr. WEISL. When do you think you ought to begin that?

Admiral BURKE. I think we should have begun 15 years ago, sir.

Mr. WEISL. But you are not beginning it now.

Admiral BURKE. We are beginning it now, sir. I think it is going to have to increase. We have 18 new ships in this program, sir.

Mr. WEISL. And you think that is sufficient for this year?

Admiral BURKE. When we start our budget—as for example, right now we are starting a budget for 1961—and as the budget submissions come in from the various Navy sponsors of the programs——

Mr. WEISL. If you will pardon my interruption, Admiral, we are talking about this memorandum that you signed for next year.

Admiral BURKE. Yes, sir. What I signed in that memorandum is that I believed that the overall budget, as submitted, would not endanger the country, and that there were no serious gaps in the programs. That I believe, sir.

Senator JOHNSON. Will you yield there?

But you stated you had some reservations.

Admiral BURKE. I stated I had reservations.

Senator JOHNSON. Would you detail those reservations to us now?

Admiral BURKE. I can't do it off the cuff, sir. I would like to put a statement in the record. Mr. Weisl has correctly pointed out some of the reservations. A good many of them are in——

Senator JOHNSON. Do you think of any other that you would like to put in the record now? Is that the only one you recall?

Admiral BURKE. No, sir, another one is procurement of new ships. There are four or five things that generally are important. Mr. Weisl has pointed out correctly that the immediate readiness of our fleet, which is dependent upon maintenance and operation funds, is one reservation. The procurement of ships, aircraft, and missiles, as I pointed out in that statement are others, too.

Senator JOHNSON. That is one of your reservations?

RESERVATIONS AS TO AIRCRAFT AND MISSILES ALSO

Admiral BURKE. Those are three, sir: The procurement of ships, the procurement of aircraft, and the procurement of missiles.

Senator JOHNSON. You do not have enough funds for any of those; is that right?

Admiral BURKE. I have reservations about what will happen in the future, sir, at the rate that we have continued for the last 10 or 15 years.

Mr. WEISL. Let's take the field—pardon me, Senator Johnson—the field of naval aviation. Are you getting enough funds for naval aviation for this year?

Admiral BURKE. I had an opportunity to explain my case, as did all the other Chiefs, before the Secretary of Defense, and before the National Security Council. These conferences with the Secretary of Defense and his staff lasted for days and days. I presented the very best case that I could for the things that we had submitted.

I realize their responsibility is greater than mine. I have the responsibility for submitting a Navy budget. They have the responsibility for the overall budget. I don't think that a Chief has ever come out of one of those conferences at any time, any year——

Mr. WEISL. I am asking you, though, if you will pardon me, Admiral, about naval aviation. The reason I ask that is that Assistant Secretary Norton testified that you are not even getting enough replacement for the aircraft that is being lost or destroyed.

Is that true?

Admiral BURKE. It is just about the same, sir. We are getting 668 aircraft in this budget. Our loss rates due to accidents are in that neighborhood.

Mr. WEISL. You think that is sufficient to give the naval aviation necessary to have the Navy protect the country properly?

Admiral BURKE. As I said to Senator Johnson, sir, that was one of the reservations that I had in the statement. I think that all the Chiefs will have the same——

Mr. WEISL. I am talking about you.

Admiral BURKE. Yes, sir, I am talking about me, sir.

Mr. WEISL. Is that sufficient? Do you think they are giving you enough funds just to replace the planes that you are losing is enough?

Admiral BURKE. This is interesting, sir, but——

Mr. WEISL. Sir?

Admiral BURKE. In an organization like this, sir, it is my duty to submit the very best case that I can submit to my seniors, to my superiors.

Senator JOHNSON. Would you have any objection to submitting that to us and telling the country what you recommend?

Admiral BURKE. No, sir, I can say——

Senator JOHNSON. Will you do that?

Admiral BURKE. Yes, sir. I have——

Senator JOHNSON. I know the responsibilities of the Secretary of Defense.

Admiral BURKE. Yes, sir.

Senator JOHNSON. And I know the responsibilities of the Chairman of the Joint Chiefs of Staff. I know the responsibilities of each

service. But what we want is the benefit of your experience and your training, your recommendations on the needs to defend this country.

Now, you say you take exceptions to some items in the budget. You evidently feel that there are some items that ought to be increased, so far as the Navy is concerned. If you do, we would like to know exactly what area you think ought to be increased.

Admiral BURKE. I can give you my original budget that I submitted to the Secretary of Defense from which this final budget was prepared.

Senator JOHNSON. Did you consider that excessive?

Admiral BURKE. No, sir, I did not.

Senator JOHNSON. How much was it reduced?

Admiral BURKE. About $2.5 billion, I think it was.

Mr. WEISL. What percentage was that of the total that you asked for?

NAVY ASKED FOR $13.87 BILLION; RECEIVED $11.37 BILLION

Admiral BURKE. That we finally got? We asked for about $14 billion. I would like to correct these figures. It is $13.87 billion, and we got $11.37 in new obligational authority. These figures correspond to total net expenditures of $12.1 billion and $11.6 billion.

Mr. WEISL. Admiral, much has been testified to about the Polaris program. Did this budget cut the Polaris program that you recommended?

Admiral BURKE. You mean in the Secretary of Defense's——

Mr. WEISL. Yes.

Admiral BURKE. Yes, sir.

Mr. WEISL. It did cut it?

Admiral BURKE. Yes, sir.

Mr. WEISL. You think that it is wise to cut the Polaris program in view of the fact that we are putting so much reliance on it and cutting out the Regulus II, altogether?

Admiral BURKE. I am in a position, sir, where I am permitted to speak my piece on behalf of the Navy, and do the very best I can before the Secretary of Defense. He is the man who is responsible for that decision, and I support his decision or I tell him about it at the time and fight like hell some more.

Mr. WEISL. We understand that.

Admiral BURKE. Yes, sir.

Mr. WEISL. We have been told that the Polaris program has got top, top, top priority, and top, top, top acceleration. Now, this budget cuts the Polaris program that you recommended.

Do you think that is wise, in view of the fact that we are placing so much reliance on the Polaris?

Admiral BURKE. I think that the Polaris weapons system is an extremely good system.

Mr. WEISL. I know you do. But you recommended a certain acceleration of the Polaris program that was not grounded in this budget.

Admiral BURKE. That is correct, sir.

Mr. WEISL. And yet you say that the budget is adequate.

Admiral BURKE. I say that this budget will not jeopardize the security of the country, sir.

Mr. WEISL. Why did you recommend an acceleration of the Polaris program?

Admiral BURKE. Because I think it is a very fine weapons system, sir.

Mr. WEISL. Don't you think it is necessary to protect this country to get that Polaris program out as quickly and in as great numbers as we can?

Admiral BURKE. If I were making the decisions as the Secretary of Defense, the decisions in some of the cases would not have been the decisions that were made, I am sure of that, and I am sure this would have been true of any other individual there, sir.

Senator JOHNSON. You realize we have some responsibility in connection with decisions to maintain an Army and Navy and Air Force.

Admiral BURKE. Yes, sir.

Senator JOHNSON. And you realize we must rely on men of character, integrity and experience like you to give us the facts.

Admiral BURKE. Yes, sir.

Senator JOHNSON. You consider the present budget, after $2.5 billion had been taken out of your recommendations, to be adequate to the needs of your service?

Admiral BURKE. Yes, sir; otherwise I wouldn't be here, sir. If I submitted a budget for the Navy that I thought would jeopardize the security of this country, I wouldn't stay in office. If the budget were pushed down that low it would be my duty then to state just exactly that, sir.

But as long as I think that budget does not jeopardize the security of the country, sir, I feel that I have a responsibility, big responsibility to the Secretary of Defense and to the President, to the administration. Also, I have a responsibility to tell you all the things that I think are good weapons system, and everything that I know, but I couldn't possibly say that I didn't think this budget was adequate and at the same time submit a different kind of a budget, sir.

ADMIRAL BURKE DECLARES $14 BILLION REQUEST NOT PADDED

Senator JOHNSON. Let me ask you this question:

When you asked for the $14 billion, did you think $14 billion was required for an adequate national defense, or did you put some fat in it?

Admiral BURKE. No, sir; there was no fat in it. The original budget that was submitted to me totaled a lot more than that. We have an examining board composed of the senior officers in the Navy, who review these budget estimates.

Senator JOHNSON. How much was submitted to you?

Admiral BURKE. Something in between $17 and $18 billion, sir; I think it was $17.9 billion.

Senator JOHNSON. Who submitted the $17 billion, $18 billion?

Admiral BURKE. The budget sponsors, sir.

Senator JOHNSON. Who?

Admiral BURKE. The bureaus, the technical bureaus.

Senator JOHNSON. So the bureau chiefs told you they thought you needed between $17 and $18 billion for national defense?

Admiral BURKE. Yes, sir.

Senator JOHNSON. You took that and squeezed it down to $14 billion?

Admiral BURKE. Yes, sir.

Senator JOHNSON. And that is what you thought was necessary for an adequate national defense when you submitted your request?

Admiral BURKE. That is what—yes, sir.

Senator JOHNSON. All right. Then they cut it to $11.5 billion, and you said, "Fine"?

Admiral BURKE. I said I would accept that, sir.

Senator JOHNSON. Well, now, you don't think it is important that that $2.5 billion stay in there?

Admiral BURKE. Yes, sir. But I don't think the United States will be jeopardized if it isn't in there.

Senator JOHNSON. All right.

What will happen as a result of the $2.5 billion going out of there?

Admiral BURKE. Well, one of the things that came out, of course, in the process was Regulus II. We cut back on the RAT program; we cut back on shipbuilding, aircraft procurement, and missile procurement, and cut throughout the whole budgetary program. The whole program was adjusted as it was examined in detail by the Secretary of Defense. The budget we submitted was based upon the elimination of a good many shore stations, too, sir.

REGULUS STILL BEST AIR BREATHER ADMIRAL OPINES

Mr. WEISL. On the Regulus II that you cut out, you testified before our committee that the Regulus II was the best air-breathing missile in existence.

Admiral BURKE. It is still the best air-breathing missile in existence.

Mr. WEISL. And it is still the best air-breathing missile in existence. They cut that out because you were going to get the Polaris, and yet they cut down the Polaris funds that you requested.

Admiral BURKE. In nearly every program that we submitted, there were funds cut out of it, sir.

Mr. WEISL. I am talking about the Polaris program which we are relying on in quantity and on dates to supplant the Regulus II. Now, you said you recommended an acceleration of that program that was denied.

Admiral BURKE. Yes, sir.

Mr. WEISL. What about antisubmarine warfare, did you get enough for that? You testified before our committee time and time again that the greatest threat facing this Nation is the submarine threat of the Soviet Union, and that you needed an acceleration of the antisubmarine warfare department of the Navy.

Did you request an acceleration of that program that was degraded?

Admiral BURKE. I requested more than we got; yes, sir.

Mr. WEISL. What other programs did you request that were degraded?

Admiral BURKE. In most all the programs that we submitted we received less money, of course, than we asked for originally.

Mr. WEISL. Was any military justification given to you to show why it was prudent and safe to cut those programs down this year?

Admiral BURKE. Regulus II is a good example of that, sir. We have done a great deal of work on Regulus II. It has been a very

successful missile. When we submitted our budget estimates for Regulus II, the missile people in the Secretary of Defense's Office stated that that was our weakest Navy missile. We had many discussions on this to try to find out the exact facts. The reason why they thought it was the weakest was that the Polaris weapon system was coming along very well. They had a high level of confidence in the Polaris system. The cost of Regulus II per missile was higher than had been originally anticipated, because we weren't buying enough to get into high rates of production. The Polaris would eventually do all the retaliation jobs that Regulus II was designed to do.

Mr. WEISL. What military justification was given to you to cut $2.5 billion off your minimum requirement which had already been cut from the substantially higher sum that had been recommended to you by your bureau chiefs?

Admiral BURKE. The adjustments made in the budget that we submit are done item by item, just like it was done in Polaris. They questioned an item; they bring in people who are very familiar with that item and similar items, and then the adjustment is made within that——

Mr. WEISL. Let me take another tack:

You say the Regulus II is the best air-breathing missile in existence.

Admiral BURKE. Yes, sir.

Mr. WEISL. The Secretary testified that they are continuing the production and availability of the Matador, which is an air-breathing missile. The Matador has a shorter range, has it not, than the Regulus II?

Admiral BURKE. Yes, sir.

Mr. WEISL. It has no larger warhead than the Regulus II, or is that classified?

Now, then, if you adopted this whole budget as fine and proper, why do you say that canceling the best air-breathing missile in the world and keeping an air-breathing missile that isn't as good is proper for the defense of this country?

REASONS WHY REGULUS, NOT MATADOR, WAS SUSCEPTIBLE TO CUT

Admiral BURKE. The Matador is an Air Force Missile. The Regulus II is a Navy missile.

The Air Force has Matador in production, and in squadrons, and the adjustments that the Air Force has to make in their budget are different, of course, than the adjustments that we have to make.

Mr. WEISL. Are there any other reservations that you had about this budget?

Admiral BURKE. No, sir, I think I have covered the whole budget.

Mr. WEISL. You haven't said anything about antisubmarine warfare yet.

Admiral BURKE. Yes, sir, I said that is in the ships.

Mr. WEISL. That is what?

Admiral BURKE. That is in the number of ships, in numbers of aircraft which are antisubmarine, and in research and development.

Mr. WEISL. How about detection in antisubmarine, that was the big problem you gave us in our previous hearings.

Admiral BURKE. Yes, sir.

Mr. WEISL. You said you needed greater funds to do research and development in that critical area.

Admiral BURKE. Yes, sir.

Mr. WEISL. Did you get enough money in that budget to do the minimum research and development in that area?

Admiral BURKE. To do the minimum, yes, sir. We have had quite good luck in the last year in some of our research projects in anti-submarine warfare. We think we will be able to continue those projects.

Mr. WEISL. But you got less than you recommended?

Admiral BURKE. Yes, sir, we got less.

Mr. WEISL. Are there any other reservations that you had?

Admiral BURKE. No, sir, I don't think so.

Mr. WEISL. General Pate, you have heard the questions that I asked Admiral Burke. When you signed this memorandum, did you know the requirements of other services?

General PATE. As Admiral Burke explained, not in detail, but I think in sufficiently broad terms to understand the problems.

Mr. WEISL. What reservations did you have about your own service?

MARINE CORPS RESERVATIONS AS TO PERSONNEL

General PATE. My budget, as you know, is included in the Navy Department budget. I had certain reservations, as did Admiral Burke, with regard to certain types of ships. In the main, insofar as my own corps is concerned, my reservations have to do mainly with personnel.

Mr. WEISL. Well, your personnel has been cut down by this budget, hasn't it?

General PATE. That is correct, yes, sir.

Mr. WEISL. Did you agree to that?

General PATE. I did not, but I accepted it as the judgment of my superiors.

Mr. WEISL. I mean, did you think this was a wise thing to do from the standpoint of carrying out your role and mission in defending this country?

General PATE. I had my day in court. I told the Secretary of Defense——

Mr. WEISL. I am not asking you that. I asked you whether you thought that that cut was prudent and reasonable.

General PATE. Personally, I would have done it another way.

Mr. WEISL. Then you didn't think it was prudent and reasonable?

General PATE. I would have preferred that it would not be done.

Mr. WEISL. Yes, sir.

Now, what about modernizing your weapons?

MARINES HAVE NO COMPLAINT AS TO MODERNIZATION

General PATE. Our modernization program is going along as planned. Actually we have nothing that we think is obsolete. Some of it is on the order of obsolescence, that is, approaching it, but our weapons, our improvements are coming along as planned. We have no particular trouble in that area.

Mr. WEISL. What percentage of your weapons are World War II vintage?

General PATE. I couldn't answer that question without looking it up. I would have to give you that for the record.

Mr. WEISL. Have you a general idea?

General PATE. Well, we have a number of weapons such as the M–1 rifle; some of our machineguns are still of the World War II vintage, perfectly good weapons, however, quite able to kill anybody that is necessary.

Mr. WEISL. But if the enemy has weapons with a greater range than yours?

General PATE. I don't think he has, particularly.

Mr. WEISL. Then you are satisfied with the kind of weapons you have?

General PATE. And with what we are getting.

Mr. WEISL. And that you are getting?

General PATE. That is right, sir.

Mr. WEISL. Has the size or composition of Marine landing teams been cut?

General PATE. Yes, they will have to be under this program.

Mr. WEISL. Do you approve of that?

General PATE. Well, I would prefer not to do it, but it is my way of doing what I think is best for the corps under the conditions.

Mr. WEISL. Do you think it is sufficient for the corps to have that cut, considering your responsibility in defending this country and protecting the lives of your men?

General PATE. When I signed that piece of paper stating that I had certain reservations, I was referring, of course, as I said a moment ago, to personnel. Now, with the way we are going to take this cut, I think the Fleet Marine Forces, the three divisions and three wings that we will have left, will be not exactly what I would like, but they will be highly trained, fully qualified to do a thoroughly good and competent job.

Mr. WEISL. And you are satisfied with it?

General PATE. Under the conditions existing today, I am, sir.

Mr. WEISL. What do you mean, "Under the conditions existing today"?

General PATE. In other words, I would like to have more men, of course.

Mr. WEISL. Well, suppose you had to use your Marine Corps in a limited war today?

COULD DO PERFECTLY GOOD JOB IN LIMITED WAR

General PATE. We can do a perfectly good job with what we will have. I would like to have more, of course.

Mr. WEISL. Has the Marine air wing been cut?

General PATE. Oh, yes; by the same proportion as our divisions.

Mr. WEISL. Are you satisfied with that?

General PATE. Again I say I would prefer that we didn't have to.

Mr. WEISL. Did you recommend a cut?

General PATE. No, sir; I did not.

Mr. WEISL. Did you oppose a cut?

General PATE. I did, sir; I opposed it.

Mr. WEISL. My time is up, Senator Johnson.

Senator JOHNSON. You have three witnesses.

Mr. WEISL. General White, you have heard the questions that I asked these other gentlemen. To save time, would you like to state your reservations about this budget?

General WHITE. I would like to make one observation, if I may.

Mr. WEISL. Yes.

General WHITE. It is a very interesting problem that is put before the Joint Chiefs of Staff. First, as service chiefs, they have to defend and justify the budget of their own service, and then they put on their Joint Chiefs of Staff's hats and sit down as a corporate body.

Now, why do these various Chiefs change their views to the extent that they can accept some changes in the budget? It is because we, all of us over the years, if not this year, then last year and all the time, we are really very familiar with what each other is doing, as service chiefs, although not necessarily as Joint Chiefs.

So when we get together as the Joint Chiefs, we really know pretty well about the other fellow's budget.

Now, when we get into a corporate meeting, Admiral Burke is very enthusiastic about the Polaris, I am very enthusiastic about the Atlas, General Pate is very enthusiastic about more Marines. We all agree these things are good things. But when we get the edges rubbed off us, we are able to agree that the overall force structure for the United States is adequate for its defense under this budget, and I signed the same statement.

One thing I think has not been mentioned before: that is, we did discuss this memorandum in a Joint Chiefs of Staff meeting before we signed it. We didn't sign it at that moment, but we agreed to it, and it was later passed around, and as Admiral Burke stated, there was a revision in it—I was away at the time. General LeMay telephoned to me—I think I was in Tokyo at the time—explained the situation, and I said I would sign it when I got back, which I did.

Mr. WEISL. You really think you had enough time to study this budget to sign?

General WHITE. I personally think that the Joint Chiefs of Staff should give more time to this sort of thing. I said so before in the reorganizational hearings, and I still think so, but I do believe that due to our intimate knowledge of each other's force structure as service chiefs, and the incidental ways in which discussions on other, not on budgetary subjects, but on planning and other subjects that come up in the Joint Chiefs of Staff, we really have a very intimate knowledge of each other's services.

Mr. WEISL. Will you please tell the committee what reservations you had about the budget?

General WHITE. Well, the reservations that I had were, and you must recognize that this is a general statement, there are a few items I would like to have. As Admiral Burke has suggested, my reservations could be given for the record later.

B–47 REPLACEMENT URGENTLY NEEDED

But, for example, one of the most pressing needs in the Air Force is to replace the B–47 fleet which is rapidly approaching obsolescence. I would like to have more B–58's, for example. A good example. A good example of why I asked for more than I got, and why I can accept it, is that one of the things I wanted was more F–105's, incidentally, a very expensive airplane, but in the interim we found out there was a production slippage in the airplane, things move very rapidly today, so we were able to reduce the amount we had in for F–105's by the amount we anticipated because of slippage, which actually occurred.

Another item the Air Force was very strong for was a nuclear-propelled aircraft. This we submitted, and we were turned down by the scientific community which says that we are not ready to go into building such an airplane yet. I have to accept the scientific judgment in the matter.

Naturally, we are going to continue our studies, but there are a couple of examples of the type of reservations I have.

Now, there are some unglamorous ones that I am afraid everybody overlooks. A perennial source of reservation on my part is our public works programs. We have to put so much money into operational facilities, for operating the force, and for taking care of new weapons, that our people suffer for lack of community facilities, for housing, and with a new base, we have one now when we really don't have any place for people to live halfway decently.

I was in Iwo Jima about a month ago. That place was just as pitiful as it was 12 years ago when I commanded the Fifth Air Force under which Iwo Jima then was a part.

The baracks are beyond anything that an American man in service should have to live in. I have since corrected it, but it took a reprograming job.

Things are in a constant state of flux, so when I say I feel that this year's budget is adequate, I have in mind changes that can be made, changes we actually have in mind today since we submitted the budget but within the total overall budget.

Moreover, if there is new intelligence, technological breakthroughs for our own part, I have no question, in fact we have been told by the Secretary of Defense that we can come back and ask for more money. So, I feel if we keep up with the rapidly shifting conditions, we have all the machinery it takes to do it.

Mr. WEISL. What did your staff recommend as a proper budget?

General WHITE. The first submission that we made to the Secretary of Defense, as I recall, was $20.6 billion.

Mr. WEISL. What did you cut that down to?

General WHITE. That was expenditures.

We finally came up with $18.675 billion, I think. I would have to check that figure. I knew you were going to ask me about it.

That is correct, sir; $18.675 billion in expenditures, and the new obligational authority would be about the same.

Mr. WEISL. What was it finally cut down to?

General WHITE. Roughly $2 billion lower.

Mr. WEISL. And you considered that adequate; did you consider that safe?

GENERAL WHITE CONSIDERS BUDGET SAFE

General WHITE. I consider it safe; yes, sir; with the reservations that I gave to you a few minutes ago about the ability to reprogram, the ability to come back for more if there be new information or new developments.

Mr. WEISL. When you recommended $18.7 billion, which was a cut of close to $2 billion from your staff, didn't you consider that reasonable and necessary?

General WHITE. I gave you some of the reasons, not all of them; but some of the reasons, that the moneys fell out.

Mr. WEISL. Well, did you consider it reasonable and necessary?

General WHITE. Yes, If you want to come to an example, I consider a nuclear-propelled aircraft a significant development, but there happened to be scientific people who overruled us on it, so there is nothing we can do about it except to try to convince them as we go along.

Mr. WEISL. What scientific people overruled you on the nuclear aircraft?

General WHITE. Well, there are many scientific advisers to the Department of the Defense. Which particular ones, I can look it up, but I don't know which ones.

Mr. WEISL. What other reservations did you have on the budget?

General WHITE. I think I have outlined the chief ones. There may be some others.

Mr. WEISL. That is all, Mr. Chairman.

Senator JOHNSON. Admiral Burke, this memorandum for the Secretary of Defense, how did that originate? Is it from the Secretary of Defense or for the Secretary of Defense? This memorandum that all of you signed——

Admiral BURKE. From the Secretary of——

Senator JOHNSON. Dated January 19.

It says that you find no serious gaps in any key elements of the budget in its present form, but have reservations with respect to the funding of some segments of your respective service programs.

Now were you requested to sign this paper?

Admiral BURKE. The chairman called a Joint Chiefs of Staff meeting originally. He stated that the Secretary of Defense, and I am quoting him now, and you probably should get it from him directly, wanted to know whether or not we thought this budget was adequate, and were there any serious gaps in it. So we discussed the budget and a statement, and then the Joint Staff drew up this statement after that discussion.

Senator JOHNSON. Were you requested to do that?

Admiral BURKE. Our discussions were with the chairman, sir.

Senator JOHNSON. Were you requested by the chairman to sign the statement?

Admiral BURKE. Yes, sir.

Senator JOHNSON. Was he requested to obtain such a statement, so far as you know?

Admiral BURKE. I don't know whether he was requested to or not.

Senator JOHNSON. Did he indicate that the Secretary wanted him to get you on the dotted line?

Admiral BURKE. I don't know about the dotted line. He indicated that the Secretary of Defense wanted to know whether or not the Joint Chiefs of Staff did believe that this budget was adequate overall and, particularly, he wanted to know whether or not we thought there were any serious gaps in this budget which would jeopardize the security of the country.

Senator JOHNSON. How long have you been Chief of Naval Operations?

Admiral BURKE. 3½ years.

Senator JOHNSON. How many times have you been requested to sign a paper like this before? Have you ever been required to sign a paper like this?

Admiral BURKE. Not exactly like this, but similar things; yes, sir. If they have a very serious problem, they frequently ask the Joint Chiefs of Staff—not frequently, but it has happened before where we have signed a statement.

Senator JOHNSON. To your knowledge, has the Joint Chiefs ever jointly signed a statement before saying that they had reservations about their respective service programs, but they approved the overall budget?

Admiral BURKE. I am not sure of those words, but I believe we have; yes, sir.

Senator JOHNSON. So you do not think this is an unusual or unique action?

Admiral BURKE. It is not the first time; no sir.

Senator JOHNSON. How can one regard a program safe with reservations? Isn't that kind of like saying you can swim the Potomac provided you can swim?

Admiral BURKE. It is a good deal; perhaps you can swim the Potomac OK if you keep yourself in good training, sir.

The Secretary of Defense, I believe, has a right to expect that the Joint Chiefs will submit to him any serious reservations. If they believe that there are any gaps in the programs, they will tell him about it before they tell anybody else about it.

Senator JOHNSON. And you have done that?

Admiral BURKE. We have done that, yes, sir, in the process of the budget review.

Senator JOHNSON. Now that you have done that, are you going to submit in detail all the reservations that you have not only concerning your own service but about the budget in its entirety, so we can make it a part of the record of this committee?

Admiral BURKE. I thought you meant just about my own budget.

Senator JOHNSON. Well, do you have any reservations as to any besides your own?

Admiral BURKE. No, sir. I think no Chief, and I am included in that, would say that this budget would be exactly what he would design if he were in the position of authority to make the decision, sir.

Senator JOHNSON. Do you have any serious reservations about any other parts of the budget outside of your services?

Admiral BURKE. No, sir.

Senator JOHNSON. Admiral, I realize that the requests that go into a budget are always generally reduced, and we don't always get what we want, but it seems to me that what you, in effect, are saying is that although we ought to modernize, and you do have some strong exceptions, you are going to sign it with reservations. You really are going to put off spending now so you will have it to spend at some future date when you won't have so much time, and when you will have to spend money faster. That is, in effect, what you have done. You said you wanted $14 billion, that is what you considered adequate. That is what you considered the national defense of this country required. That was your prudent judgment.

You reviewed all the recommendations of your Section Chiefs, and you said, "I am going to stamp my approval on this, and I urge you to set aside $14 billion."

It went upstairs and it came back to you at $11½ billion, and now you say that, in your opinion, the $2½ billion can come out without jeopardizing our national defense.

Well, to me you made a different statement when you asked for $14 billion.

It seems to me you concluded then that $14 billion was what the national defense required.

Now do you reconcile 1 week requesting $14 billion, and the next saying, well, $11½ billion is adequate?

Admiral BURKE. We go through the same process before the congressional Appropriations Committees, too, sir.

These budgets that the Congress now has before them will be adjusted by the Congress some way or another. We will have an opportunity to explain in detail. We would prefer that some of those adjustments not be done.

CUTS DO NOT JEOPARDIZE SECURITY, ADMIRAL SAYS

We think that, perhaps, it shouldn't have been done, but still it is not of sufficient seriousness to jeopardize the security of the country. It is a difficult problem, sir, I realize that.

Senator JOHNSON. It is a very thin line there.

I want this budget to be as low as we can get it.

Admiral BURKE. Yes, sir.

Senator JOHNSON. I want to spend as little as we think is necessary, and I think every other person in this country realizes that if we are not in any danger and we do not have to worry about any war, why, maybe we are spending entirely too much.

On the other hand, if we are in danger, we are probably not spending enough. And the Secretary of Defense has to rely on you for advice, and we have to rely on him and you for advice.

Now what we want to be sure of is that we have an adequate national defense, that the men that have gone through our Academies and have had the wealth of experience that you men have, have come to an independent conclusion that you think that the money provided in this budget is adequate to your needs.

If that is true and if you feel that way, this committee wants to know it and the country wants to know it.

Some of the members may disagree with your conclusions, but we want to be sure that in your heart you feel that the $11½ billion in

this budget for the U.S. Navy is adequate in the view of the Chief of Naval Operations. Is that true?

Admiral BURKE. Yes, sir. I signed——

Senator JOHNSON. Well, you are signing with reservations.

Admiral BURKE. Yes, sir.

What I don't want is to leave the impression that we can go on in the future. For example, we are going to run out of ships some day.

Senator JOHNSON. Yes, you are.

Admiral BURKE. At the same time, there are problems other than the Navy that confront the Government, confront the Congress.

Senator JOHNSON. We hear about some of those from time to time.

Admiral BURKE. Yes, sir; and those are not my problems.

Senator JOHNSON. I understand.

Admiral BURKE. So I defer to the judgment of the people who do examine all of these problems.

Senator JOHNSON. But I am deferring to your judgment now, and I want your judgment. I do not care about your giving your judgment on something else in another field over here, we will say, mutual security. We will have to exercise our judgment there.

I want your judgment.

Is it your judgment that the $11½ billion provided in this budget is adequate for the needs of the modern U.S. Navy of which you are Chief of Naval Operations? And is that adequate, and are you willing to say to 175 million people and stand on that statement that this is your recommendation and, in your opinion, that it is adequate?

ALL CHIEFS CONCUR IN ADEQUACY OF BUDGET

Admiral BURKE. Yes, sir.

Senator JOHNSON. Thank you. That is what I want.

Now, what about you, General? How do you feel about it?

General PATE. I concur.

Senator JOHNSON. General White?

General WHITE. I agree, sir.

Senator JOHNSON. Thank you very much.

Senator Stennis?

Senator STENNIS. Mr. Chairman, I have had a chance to hear the briefings by these gentlemen within the past week or 10 days, and I do not want to plow that ground or others that have been mentioned here this afternoon. But I just want to observe to Admiral Burke and the others, of all the briefings we had, the thing that impressed me the most and not included in the budget is the situation there where you have actually to reduce your combat battalions. You were very eloquent on the second point, without intending to be so, Admiral Burke, when you were talking about the need to modernize the Navy while replacing those ships that you say are wearing out. I am referring to your testimony the other day.

And the next thing that impressed me was when I thought what was the need for airlift of our ground troops, further airlift, and then this Regulus and Polaris matter.

I'm just going into one of those now very briefly with Admiral Burke.

But, first, we have testimony for military installations, and the witnesses from all the services emphasize always that this particular item

has been approved by the Joint Chiefs of Staff; it is their direct recommendation that it be authorized and money be appropriated.

In my early days of service, I thought that meant that you had gone out there as a body or sent someone to represent you and look over and reported back that it was reasonably necessary, if not essential.

But I found out, if I understand it, that to say it has been approved by the Joint Chiefs of Staff does not mean individual approving of all these items.

For instance, requests for an additional hangar at an air base that is in the budget, for the witnesses to say that it has been approved by the Joint Chiefs of Staff, does that include the idea that you have approved it or that you have any personal knowledge about the need for that hangar, and I am just using that as an illustration?

Admiral BURKE. Yes, sir.

We have in the Joint Chiefs of Staff a list of facilities; the book is about that thick. It is about 2 or 3 inches thick, and it has the facilities of all the services arranged in that book.

It is prepared by the Joint Staff, and then it is issued to the services.

Our own service staff goes over this book in detail, not only for our own facilities but also for the other services. They have a pretty good idea of what is in that book in detail.

I am briefed on that book, and I take a few exceptions thereto, some of my own, some sometimes to the other services. We discuss those exceptions that each Chief brings up in the Joint Chiefs of Staff.

But you were quite right. If a hangar that is put in for a facility by one service—it may not get a detailed examination. I mean that I, as an individual, do not know the need for that hangar.

Senator STENNIS. It means you have approved it to the extent of its being in a general program that you approved; is that about it, as near as you get to it?

Admiral BURKE. Yes, sir.

Now, there are some things, of course, where my staff brings up matters that I examine more thoroughly.

Senator STENNIS. Well, now, in getting on to this matter here that I mentioned this morning, and I am not pro-Marine or pro-Army about this, but the hardest thing for me to understand, assuming you are going to make these reductions, is why you would let those reductions apply, in your combat teams, say, in the Army and in the Navy.

Now, did you give an order that personnel reduction should be brought about or was that made necessary by virtue of the ceiling on the amount of money the Navy received?

Admiral BURKE. You mean me?

PERSONNEL ALLOCATION MEANT REDUCING TO 864 SHIPS

Senator STENNIS. Yes. I am talking now about the Marine combat teams, but it all comes within your appropriation.

Admiral BURKE. We operate under a personnel allocation, each service. For example, the personnel allocation of the Navy is 630,000.

Now, a few years ago it was much greater than that, 675,000. I agreed to a cut in 1957, from 675,000 to 645,000, and to a further cut in 1958 from 645,000 to 630,000.

In the process of doing that, we had to reduce the Navy from about a thousand ships to about 864 ships.

We did the same thing in the numbers of aircraft.

Now, this year when we were discussing the personnel limitations in all the services, I said, "We cannot go down. We have done everything that we possibly can. To go down to save men, we have cut our manning levels, we have cut our shore establishments, we have cut everything we can, and the only place we can cut manpower is to cut more ships."

So our personnel ceiling was left at 630,000.

Now, the Marines argued their own case here. They submit their requests for money for the number of men that they are permitted to have. There never is any question about that. I have no control over the number of Marines.

Senator STENNIS. I do not want to limit you, but we are limited as to time.

The point is, did you give the order here to reduce the number of men in those combat teams, or the number of teams?

Admiral BURKE. No, sir.

Senator STENNIS. All right.

General Pate, that left it up to you, did it?

General PATE. I gave the order; yes, sir; that is my responsibility.

Senator STENNIS. Why couldn't you absorb that reduction in money or reduction in men some way other than reducing the number or the size of your combat teams?

General PATE. Senator, as I explained the other day at your other hearing, we are in the same boat that Admiral Burke is in.

We have been taking reductions for a number of years. We have absorbed reductions over the last several years. We have reached the point now in our other commitments and responsibilities below which we simply cannot go.

We now are cutting out combat units just as Admiral Burke is eliminating ships, and for the same reason.

Senator STENNIS. Well, I know you did not approve of making that reduction. Did you go back and make another plea for enough money to keep those men?

General PATE. I made my plea, don't worry, sir.

Senator STENNIS. After you found though it was necessary for you to reduce these numbers, especially out of the airplanes and combat units, did you make another effort—I am not suggesting you failed to do your duty or to be a real marine, of course—but I wanted to know what your latitude was there?

General PATE. I was very careful to explain to my superiors what it meant to the Marine Corps, sir.

Senator STENNIS. Well, it means a reduction in your landing forces, does it not?

General PATE. That is correct.

Senator STENNIS. The fighting power, the men who carry the rifles?

General PATE. It does, indeed, sir.

GENERAL PATE WOULD HOPE CONGRESS WOULD CONSIDER RESTORATIONS

Senator STENNIS. Do you—well, I will put it this way, I do not want you to ask the Congress—but Congress certainly may use its time well to consider whether or not this should be restored; isn't that correct?

General PATE. I would hope they would think about it.

Senator STENNIS. The same applies with reference to the landing groups of the Army, so far as you see that picture; it is not just a pro-Marine position?

General PATE. That is right; yes, sir.

Senator STENNIS. Mr. Chairman, I thank you. My time is up.

Senator JOHNSON. Senator Saltonstall?

Senator Symington?

Senator SYMINGTON. General White, previous statements and implications that the United States is planning to close the long-range missile gap have now been denied under oath by the Secretary of Defense.

This morning the Secretary stated that as of now, this great country is planning to let the Russians take a substantial lead in ICBM's.

He has stated, and I have stated, that we plan to let the Russians have many times the number of ICBM's we will have in a relatively short period of time. At least that clears the record on that important point of fact.

The Secretary justified that position this morning, on the basis of what we would have left after we had been attacked in the way of other methods for delivering retaliation.

Presumably, that would include the Polaris, when we get it, and the bombers in the Strategic Air Force, and some IRBM operational capacity when we get that.

Right now, with the exception of assistance by carrier task forces, the main retaliatory capacity would be in the Strategic Air Force, would it not?

General WHITE. Yes.

Senator SYMINGTON. Would you want to discuss in an open hearing the question of air alert and combat ground alert, or would you prefer to defer that to a classified hearing?

General WHITE. We presently have a ground alert of a considerable number of aircraft. We have developed the feasibility of an air alert. I think that is all I would care to say in an open session now, sir.

Senator SYMINGTON. A minute ago you volunteered an interesting observation. You said that the B–47 was rapidly approaching obsolescence.

Would you care to tell the committee in open session or in a classified session what percentage of the B–47's compose the total striking force of SAC?

General WHITE. On the order of, I think it is, 1,500 B–47's are in SAC out of a total of, roughly, 2,000 aircraft.

Senator SYMINGTON. So you are saying that despite the fact that we plan to let the Russians attain a substantial lead in long-range ballistic missiles and despite the fact that we have yet to have any appreciable retaliation capability from IRBM's or Polaris submarine weapons, our main capacity to retaliate after being hit is in SAC, and that three-quarters of SAC aircraft is rapidly approaching obsolescence; is that correct?

General WHITE. I think that is a fair statement.

Senator SYMINGTON. Thank you.

Would you care to give us the plans you have for replacing these obsolescent airplanes? How many per year do we plan to replace out of the 1,500 that you mentioned?

1964 TOTAL PHASING OUT DATE FOR B–47's

General WHITE. We are planning to reduce the total B–47 force. They will completely phase out, I think it is, in 1964. That is 5 years from now, or earlier.

We are programing more B-52 wings, and B–58 wings, and the intercontinental ballistic missile squadrons, the Atlas and the Titan.

Senator SYMINGTON. If the situation is as it has been described by the Secretary of Defense and by you, then it is important that we have SAC as modern as we can possibly afford; is that not correct?

General WHITE. I think it is a very important consideration; yes, sir.

Senator SYMINGTON. Recently the Air Force told me that in their opinion the No. 1 priority for SAC was the KC–135 tanker.

Would you care to comment as to why the money that was appropriated by the Congress last year to purchase more KC–135 tankers was not used and that there are no plans to use it for that ship in the fiscal year 1959?

General WHITE. All I can say about that, sir, is the money was carried over into the fiscal 1960 budget.

Senator SYMINGTON. Do you think that was wise?

General WHITE. I think we can live with it.

Senator SYMINGTON. What do you mean, "live with it"?

General WHITE. Well, every day, we are getting a higher proportion of KC–135's into the fleet.

We always like to see things move faster, but we are getting, in my opinion, a satisfactory progression of KC–135's into the force. Each one adds enormously to the capability of the bombers which it supports.

Senator SYMINGTON. Thank you, Mr. Chairman. My time is up.

Senator JOHNSON. Mrs. Smith?

Mr. Bartlett?

Mr. Wiley?

Senator WILEY. Thank you, Mr. Chairman. I want to compliment you gentlemen. You were given a pretty good razzing today.

I want to ask you a few questions I think the people might be interested in. You people can answer this separately or in a group.

War itself has been a changing proposition, has it not? Take, for instance, the British; they are changing their Navy, are they not?

If that is so, I presume that what has taken place in the past, when we spent our money for the Army and the Navy to a large extent we have seen the need for spending more money for the air and for the missile programs; is that not correct, percentagewise?

Admiral BURKE. Sir——

Senator WILEY. Percentagewise, I am talking about.

Admiral BURKE. There have been changes in all the services where aircraft have become very important, and missiles are now becoming very important; yes, sir. The weapons change.

Senator WILEY. We are not standing alone, Admiral, in the world? We have got allies.

Admiral BURKE. Yes, sir.

Senator WILEY. We have got bases close to the potential enemy?

Admiral BURKE. Yes, sir.

Senator WILEY. And those countries that are our allies have the missiles?

Admiral BURKE. They will have; yes, sir.

WE WOULD NOT MAKE WAR UNLESS ATTACKED

Senator WILEY. Now, is it not the purpose of America's organization in the air, on the ground, the Navy, the missile program, to act as a deterrent to war, and not to make war unless we are attacked?

Admiral BURKE. Yes, sir.

But in explanation of that, the only way we can really deter an enemy is to make sure that we aren't bluffing, to make sure that we have the capability to destroy him if he should be so foolish as to start a war.

General WHITE. Perhaps you would let me add something, too, Senator. I think more than that is establishing in his mind the credibility that we have that capability. If he doesn't believe it, he won't be deterred.

Senator WILEY. Is it your opinion that America has that capability with its allies?

General WHITE. As of the present moment unquestionably, and I think history proves it, sir.

Senator WILEY. If a world war should come involving missiles someone of authority said the other day, I think he said, it would last about 48 hours.

Do you want to change that or do you want to think that we would use megaton bombs?

General WHITE. In my opinion, war will be a matter of a few days or a few hours because of the enormous destructiveness of modern weapons, the decisive phase; that doesn't mean the war will necessarily be completely at an end. In my opinion, the decisive phase is a matter of a few days only.

Senator WILEY. If I got your answer right——

General WHITE. Yes.

Senator WILEY (continuing). It would be a short duration.

General WHITE. Very short, sir.

Senator WILEY. Now, is it so that this kind of war itself then has changed the significance, relative significance of the old-fashioned Navy and the old-fashioned Army?

General WHITE. That is very true, sir. To some degree, if you want to call it old fashioned, the old-fashioned Air Force. We are all changing in the light of technology.

Admiral BURKE. Could I add to that?

Senator WILEY. Yes.

THERE ARE LESSER WAR SITUATIONS

Admiral BURKE. Could I add to that a little bit, sir?

In general war, for an exchange of nuclear weapons in a general war, that is true.

But there are a lot of lesser situations which we have been having recently, too, which require other types of equipment.

Senator WILEY. You are talking about local or brush-fire wars?

Admiral BURKE. Yes, sir.

Senator WILEY. Yes.

But as to our real deterrent that we have been building—and to me we started back at the time of the previous President—I was informed that instead of a 90-wing Air Force, we got a 70-wing Air Force, and went down to a 48-wing Air Force.

I am not criticizing that. I am simply saying that in order to get the true picture we have got to think also in terms of demolishing America economically.

If we have got the deterrent, then we have got to build the internal strength economically. We cannot do that by simply voting vast sums of money for what you might call materiel and equipment that in a year or two would be obsolete; is that right?

Admiral BURKE. Yes, sir.

The strength of a country is dependent upon, of course, its military strength, its economic strength, political strength, and all the other strengths. It is the total strength of the country.

Senator WILEY. Are you satisfied, Admiral, that when you specialists—which we are not—got together, and each one, of course, wanted to improve his lot, so to speak, agreed upon the final agreement, that that was in the interest of the general welfare and the general safety of America?

Admiral BURKE. Yes, sir.

Senator WILEY. Do you other two gentlemen agree on that, too?

GENERAL PATE. I do; yes, sir.

Senator WILEY. That is all, Mr. Chairman.

Senator JOHNSON. Mr. Magnuson?

Mr. Martin?

Senator MARTIN. Thank you, Mr. Chairman.

I am impressed a bit by your recommendation here today in the light of General White's statement that the next war will last a few hours or a few days.

Does your program now include enough Air Force and ship power and manpower to carry us through a war with any adversary that we anticipate may be ours within the immediate future?

Admiral BURKE. You mean a general war, sir?

Senator MARTIN. Yes.

NO COUNTRY COULD WIN IN A GENERAL WAR

Admiral BURKE. Senator, in a general war, with the use of megaton weapons that we now have, and that the enemy has, no country can win. We have the capability now to destroy Russia, and destroy her utterly if she starts a war.

She also has the capability of wreaking heavy destruction on this country. If she doesn't have, she soon will have, and so there is no way now, and I see no way in the future that we can win such a war and have a country similar to the one that we now have after the thing is over.

Senator MARTIN. The principal function then of the forces that you have recommended here in these hearings is to deter war rather than to think of them as adequate to survive a general war?

Admiral BURKE. Well, yes, sir; and, as General White pointed out, deterrence is in the state of the mind of the enemy. It is to convince the enemy and to have the capability to actually perform in case it is needed.

Senator MARTIN. That is exactly what I had in mind about deterring wars.

Admiral BURKE. Yes, sir.

Senator MARTIN. It is to convince a potential adversary that that is our capability, to meet him so devastatingly that he cannot afford to start that general war.

Admiral BURKE. That is correct, sir.

Senator MARTIN. That is all, Mr. Chairman.

Senator WILEY. Mr. Chairman, there was just one question I noticed I had forgotten.

Senator JOHNSON. Senator Wiley?

Senator WILEY. I think it is important to get from you gentlemen. Are we constantly in the modern sense on the alert and ready to go if the Kremlin should let the balloon go up?

General WHITE. I would like to answer that, if I may, sir. I am sure we are. I speak chiefly for the Air Force.

I mentioned awhile ago that SAC, a number of aircraft are on a 15-minute alert.

The air defenses are on constant watch. The air defense fighter forces are on a 2-minute alert in many places.

The tactical air forces are ready to go on a few hours' notice, and they did so in the case of Lebanon and Taiwan.

I think it could be said that all over the world our forces are on the alert.

Senator WILEY. That applies to our main allies, too?

General WHITE. I am speaking chiefly of our own, but I think the same thing applies to our allies, probably to a lesser degree.

Senator WILEY. The Kremlin knows that, does it not?

General WHITE. I think they must.

Senator JOHNSON. Senator Wiley, have you concluded?

Senator WILEY. Yes, thank you.

Senator JOHNSON. Senator Anderson?

Senator Case of New Jersey?

Senator Kerr?

Senator Young?

I beg your pardon, Senator Case. Senator Case of New Jersey is recognized.

YOU ALWAYS GET LESS THAN YOU ASK

Senator CASE of New Jersey. I don't want to question you and raise any inference in anybody's mind that I think we are spending or not spending enough money, but is it not a fact that throughout the history of budget making as you know it, you always ask for more than you have gotten?

Admiral BURKE. We always received less than we asked for; yes, sir. [Laughter.]

Senator CASE of New Jersey. I will accept that as an answer to the question. And that is true of all services, is it not?

General PATE. All services.

Senator CASE of New Jersey. So that fact alone does not justify anything more than the fact that the combined judgment of the person finally in charge usually has resulted in a reduction in what each of you individually required as optimum for your several services?

General PATE. Right.

Senator CASE of New Jersey. And it is true, generally speaking, that within your services the bureau Chiefs have usually asked you for more in the aggregate than you have found it necessary, and have asked, in turn, of the Department of Defense or your superiors?

Admiral BURKE. Yes, sir.

Senator CASE of New Jersey. That is all; thank you, Mr. Chairman.

Senator JOHNSON. Senator Young?

Senator YOUNG. Admiral, you stated in answer to a question by Senator Wiley you believe that our allies would have the missiles in time.

Now, are you able to give more definitely your opinion in this open meeting when you expect that our allies would have those missiles in effective quantities and numbers and time?

Admiral BURKE. I think that probably the specific answer should come from General White, sir, because they are all IRBM's. His missiles are being turned over to some of our allies—and some of them are being installed at the moment, sir.

There are negotiations for some of the others. Perhaps negotiations should not be mentioned here, I would like to ask General White if he can answer the question specifically, sir.

Senator JOHNSON. General White?

UNITED KINGDOM MISSILE BASE PROGRESSING WELL

General WHITE. Well, the first of the IRBM's for the allies is in the United Kingdom. It is a Royal Air Force unit.

I visited it about 3 months ago; it is progressing very rapidly, and their capability to operate it is one that I think should speak for itself. They are making great progress.

The weapons are all there, and the logistics support for them is on hand.

They are in training and coming along very well, in my opinion.

Senator YOUNG. It will take some little time yet?

General WHITE. To complete the program; it is an extensive program.

The United Kingdom will have a total of four, and there are others that are dependent upon further negotiations with NATO nations.

Senator YOUNG. But you are pretty well satisfied with the situation at the present time as to that?

General WHITE. I would always like to see things move faster, Senator.

Senator YOUNG. I think I have no further questions to ask at this time.

Senator JOHNSON. Senator Dodd?

Senator DODD. I have no questions.

Senator JOHNSON. Senator Cannon?

Senator CANNON. Thank you, Mr. Chairman.

Admiral Burke, getting back to your budget as originally presented, at the time you presented your budget and asked for $14 billion, let me ask you if you had the program in that budget for the Regulus II?

Admiral BURKE. Yes, sir.

Senator CANNON. And did you also have in there an advanced program for Polaris?

Admiral BURKE. You mean more than——

Senator CANNON. More than you now have?

Admiral BURKE. There were a good many adjustments in the program; yes, sir. We had more.

Senator CANNON. May I ask if you represented to the Secretary at the time you presented your budget that elimination of either the Regulus II or the advanced program of Polaris, or both, would jeopardize our defense position, in your opinion?

Admiral BURKE. We explained not only for that program, but for all programs what would happen; yes, sir.

Senator CANNON. I understand that you no doubt explained what you thought would happen. But I want you to answer my question: Did you represent to the Secretary that the elimination of those two items would, in your opinion, jeopardize our defense position?

Admiral BURKE. No, sir; we didn't say that it would jeopardize our defense position. We said it would reduce our capability.

Senator CANNON. I see.

Now, in relation to brush-fire wars, as you mentioned, do we have sufficient capability, in your opinion, under the budget as now proposed, to take care of any brush-fire wars that are likely to occur?

WE WERE STRETCHED THIN IN LEBANON AND TAIWAN

Admiral BURKE. In the last year, in Taiwan and Lebanon, we were stretched very, very thin, very thin indeed. It depends entirely, of course, on what is liable to happen. I think that we can handle any situation that will probably happen; yes, sir.

Senator CANNON. Are you basing that on the assumption that it would be of no greater magnitude than the Taiwan and Lebanon incident?

Admiral BURKE. We would not have to deploy many more forces than we had started to deploy then; yes, sir.

Senator CANNON. And if you had to deploy more forces in those instances you would not have sufficient coverage.

Admiral BURKE. We could have done it for a very short time, but not for any sustained operations.

Senator CANNON. You heard General White mention that in his opinion the decisive phase of a general war would be only a few days of duration. Is a good deal of your budget directed toward taking care of a brush-fire-type of war?

Admiral BURKE. The only thing that a Polaris is good for is mass destruction, to destroy an area with megaton weapons. All of that is done in general war. The rest of our forces have dual capability. The carriers, for example, have a capability both for general war and for limited war, and a good many of our other forces do, too.

You take antisubmarine forces; they may be used in both limited war and general war. It doesn't make any difference. So you cannot divide our budget up to that portion that is only good for general war or limited war, except for Polaris, which is good only for general war.

Senator CANNON. And that is the only item that you feel would be of benefit solely to general war?

Admiral BURKE. Yes, sir.

Senator CANNON. Now if General White's statement is correct that the decisive phase of the war would be only a few days, then the antisubmarine phase of it would not be too important, would it?

Admiral BURKE. Well, it depends entirely upon what the enemy does with his submarines. If he builds missile submarines and if he deploys those missile submarines off our coasts, the enemy's submarines may be the ones that can do the deciding, their missile submarines.

If we haven't an antisubmarine capability which can detect and destroy those submarines, we would be in a bad way, and so what we have to do is the same thing the enemy has to do. We have to be able to counter all the attacks that he may make against us, no matter how he makes them, whether it is by submarines, air, missiles, or some other means. If we are weak in any one of them, that is the element he might use.

Senator CANNON. Thank you, Admiral.

WE WILL CUT NUMBER OF MANNED AIRCRAFT

General White, may I ask if you are free to state whether or not there is a gap between the phasing out of the B–47's and the phasing in of the B–58's?

General WHITE. I do not think it is proper to speak of it as a gap. I think that the force is going to be less effective with a smaller number of aircraft which we will have until we get the B–52's and the B–58's phased in. But it is our intention to cut the total number of manned aircraft.

Senator CANNON. And will there be a point in the program where we will have less air protection due to the phasing out of the B–47 by reason of the fact that the B–52's and B–58's and the missiles are not completely into the program?

General WHITE. I do not think so because of the higher performance of the B–52's and the B–58's phased in to replace them.

We are actually going to reduce B–47 wings at the rate of two per B–52 wings that go in and the same on the B–58's programed over the years.

May I make an observation, Senator, that I think is pertinent? My interpretation, and I think it must be the one that the other Chiefs took when we stated that the forces were adequate, we included adequacy for limited war within that statement.

Senator CANNON. Thank you very much.

Senator JOHNSON. Admiral, is the United States doing everything that it reasonably can and should do to insure the defense of this country and the free world against military aggression in your opinion?

Admiral BURKE. There is always more that can be done, sir.

Senator JOHNSON. Is there more that should be done, then?

Admiral BURKE. Yes, sir. One of the most difficult things is to persuade all of our allies of the things that we think they should do. They sometimes do not think the same way we do.

Senator JOHNSON. Are we doing everything that we reasonably can and should do?

Admiral BURKE. Yes, sir.

Senator JOHNSON. In your opinion?

Admiral BURKE. Yes, sir.

Senator JOHNSON. Do you concur, General Pate?

General PATE. I think within reason we are, yes, sir. As I said when I signed that statement, there are certain reservations and I have reservations about all the services, including my own, but other than that, I think we are reasonably doing what we should.

Senator JOHNSON. General White?

General WHITE. That is a fair summation.

Senator JOHNSON. Do you concur?

General WHITE. Yes, sir.

Senator JOHNSON. Mr. Russell?

Mr. Bridges?

Mr. Stennis?

Senator STENNIS. Mr. Chairman, I have no further questions now.

Senator JOHNSON. Mr. Saltonstall?

Mr. Symington?

Senator SYMINGTON. Admiral Burke, a report on international security by the Rockefeller Brothers Fund—the people who compose this group are outstanding citizens of the country—was issued last year. These outstanding citizens said:

> We are convinced that corrective steps must be taken now. We believe the security of the United States transcends normal budgetary considerations and that the national economy can afford the necessary measures. Our panel therefore hopes that the most important result of recent Soviet advances in the field of earth satellites may be that they will serve to spark a deeper view of the basic attitudes and policies affecting the security of our country and of the free world, for the United States lag in missiles and space machines, however, worrisome, is a symptom and not a cause. It reflects our national complacency over the past dozen years.
>
> VITALLY IMPORTANT TO SET ABOUT CORRECTING DEFICIENCIES
>
> It is vitally important to the United States to calculate its security requirements on an integrated and long-range basis and to set about correcting all deficiencies.

Then on the last page of the report, they said:

> Starting immediately defense expenditures must be increased substantially over the next few years. Testimony indicates that current deficiencies in our strategic posture required additional expenditures each year of approximately $3 billion for the next several years. This does not include necessary increased appropriations for mutual assistance and for civil defense.
>
> Because we must maintain our present forces as we go into production on new weapons such as missiles, the cost of military programs will continue to rise until at least 1965. Specific recommendations include the following:

and I will read just the first one.

> Aircraft procurement to modernize existing units be authorized into the 1960's while pressing for most rapid development of operating intermediate range and intercontinental ballistic missiles.

Another significant and even more recent report was issued by the Committee for Economic Development, which includes a large number

of the most prominent citizens in America, all of whom are conscious of the problems of taxation in the economy. This report says:

> We see no need to be apprehensive about whether or not the American economy can stand the strain of this or even a considerably larger budget. The risk that defense spending of from 10 to 15 percent of the gross national product, or if necessary even more, will ruin the American way of life is slight indeed.

Do you agree with the findings of those people?

Admiral BURKE. I have read both of those reports, sir, and some of the findings, of course, in a big report like that I do not agree with.

The ones that you have read—I don't know what this country can stand. I am not a tax expert, or an economist.

Senator SYMINGTON. I am not asking you to talk from the standpoint of a tax expert. I asked you to comment on that from the standpoint of your ability and experience as a military leader for which I have great respect.

Admiral BURKE. The cost of our military equipment is going up by tremendous leaps, both due to increasing labor and materiel costs, and due to the complexity of the equipment. It is undoubtedly true that costs of new equipment will continue to increase, and our budgets, I think, will continue to increase, as they have in the past.

Senator SYMINGTON. Certainly here in this hearing, and under oath you are free to give your opinion to the American people.

If we followed the Rockefeller report, we would be adding $6 billion to the fiscal year 1960 budget instead of which the administration is asking that the Congress appropriate hundreds of millions of dollars less. Do you think that is right from the standpoint of our security?

MILITARY STRENGTH ADEQUATE NOW

Admiral BURKE. The security of the country, Senator, is dependent upon more than just the military strength of the country. The military strength of the country, I think, is adequate now. I think it is going to take some very nice judgment and very serious thought to determine just what the strength of this country in its various elements should be, including our ability, as a country, to work.

Senator SYMINGTON. I understand that.

Let me ask you one more question on this particular point. How much did you ask for for the Navy?

Admiral BURKE. About $14 billion, sir.

Senator SYMINGTON. And how much did you get?

Admiral BURKE. About eleven and a half, sir.

Senator SYMINGTON. Is it your policy to pad your budget because you think you are going to be cut anyway?

Admiral BURKE. No, sir.

The budget that we submitted originally was a very solid budget, sir.

Senator SYMINGTON. And you thought that $14 billion was what we needed in the best interests of the security of the United States; is that correct?

Admiral BURKE. Yes, sir.

Senator SYMINGTON. Thank you, Admiral.

No further questions, Mr. Chairman.

Senator JOHNSON. I want to express my regrets to Senator Case that when the staff made up the list of the members of the Preparedness Subcommittee and the Space Committee, they did not list the ex officio members of the Armed Services Committee. I did not see the Senator, and therefore he did not get to question when his time came. But understanding as he is, I hope he will understand my situation.

I now recognize Senator Case.

Senator CASE of South Dakota. Mr. Chairman, I understand full well. Further than that, I am not a candidate for President, or anything of that sort, so taking second position in asking questions does not bother me in the least.

RESERVATIONS WERE NOT IN CRITICAL AREAS

Admiral Burke—and I address this question to all three of the members of the Joint Chiefs of Staff who are present, it occurs to me that we can characterize your requests as being for the items which you would regard as desirable, essential, or critical.

Now, having in mind the statement which you signed and the reservations that you had in mind, would you, Admiral Burke, say that the reservations that you had were for items that you would regard as desirable, essential, or critical?

Admiral BURKE. I would not have signed that statement, sir, if I had reservations on a critical item, so that the reservations that I have are not critical, sir.

Senator CASE of South Dakota. How about General Pate?

General PATE. I feel the same way, sir.

Senator CASE of South Dakota. And you, General White?

General WHITE. Nothing critical.

Senator CASE of South Dakota. Reference has been made to the testimony of the Secretary this morning, and I want to refer to that as a premise in asking a question.

I personally do not recall that I heard the Secretary admit or testify at any time that the Soviet would have a superiority that would be several times that of the United States in the intercontinental ballistic missile or in ballistic missiles.

My recollection is he said that there would be a superiority in the intermediate range ballistic missiles. He was not sure of the relative position with regard to the ICBM. Now then, he went on to say that our relative capabilities were dependent in part upon other carriers of nuclear weapons and the ICBM.

I would like to ask you, Admiral Burke, what capability does the Navy have to deliver a nuclear weapon today?

Admiral BURKE. Carrier aircraft, sir.

Senator CASE of South Dakota. Carrier aircraft?

Admiral BURKE. Yes, sir. We have Polaris coming along, but it is not operational at the moment.

Senator CASE of South Dakota. Do any of the submarines have the capability of delivering a weapon with a nuclear warhead either submerged or surfaced?

Admiral BURKE. Yes, sir.

We have a Regulus I capability, in some submarines and cruisers, which will carry a nuclear warhead.

Senator CASE of South Dakota. What, if you can say in open session, would be the range of the Regulus I?

Admiral BURKE. I do not think I should say that in open session, sir.

Senator CASE of South Dakota. Further, Admiral Burke, what is your evaluation of desirability of atomic power for the next carrier?

Admiral BURKE. Atomic power in a carrier gives some very significant military advantages, but it is also very expensive.

In any of these budgets you have to balance the military advantages that you gain versus what other things you could get for the same amount of money.

NEED FOR NUCLEAR CARRIER NOT CRITICAL

Now the need for a carrier in this budget is critical. We need a carrier very badly. The need for a nuclear power in that carrier is not critical. It is one of the things that would be desirable, but it is not critical.

Senator CASE of South Dakota. Can you get the carrier more quickly if you do not insist upon the atomic power at this time?

Admiral BURKE. It is not significant. It would be perhaps several months earlier, but not much more than that.

Senator CASE of South Dakota. Primarily, it is the fact that you would rather spend the money on something else than on the nuclear power?

Admiral BURKE. Yes, sir.

Senator CASE of South Dakota. General White, are you satisfied with the dispersal that has been accomplished so far as the long-range bombers are concerned?

General WHITE. It is going according to schedule.

Senator CASE of South Dakota. What about the dispersal planned for the launching pads for the ICBM?

General WHITE. We have some additional technological information that indicates to us that we can and should disperse the ICBM's to a greater degree than we originally planned, and we are studying that with a view to reprograming within the present budgetary allocation.

Senator CASE of South Dakota. And in the development of the plans for handling the ICBM is it correct that you are constantly considering ways to increase the effciency and to cut down the countdown time?

General WHITE. Yes, sir.

As we get more experienced, we are cranking in everything we learn in order to get the most rapid countdown possible.

Senator CASE of South Dakota. Mr. Chairman, I just merely want to say to General Pate that I share with Senator Stennis a concern for the personnel of the Marine Corps, and I think we will all want to give some further consideration to that as the time comes.

Senator SYMINGTON. Will the Senator from South Dakota yield to me?

Senator CASE of South Dakota. Yes; I will yield to you.

Senator SYMINGTON. Let me tell the distinguished Senator, if I may, I did not state that the Secretary of Defense at these hearings had said that at a certain period in the future the Communists will

have several times the number of ICBM's that the United States will have. I said he had said it, but I didn't say he said it at these hearings.

I thank the Senator.

Senator CASE of South Dakota. Whatever the record is, I am just glad to have an opportunity to say that I did not understand the Secretary ever testified to that effect. I thought to the contrary, that instead he was testifying that there would be several times the superiority in numbers of intermediate range missiles, but that as to the intercontinental ballistic missile, he wasn't sure.

Senator SYMINGTON. I was not talking about testimony. I simply said that the Secretary has publicly given some figures which would show that at a specified future date the Russians would have several times the number of ICBM's that this country would have at that time.

Senator CASE of South Dakota. He did not testify to that effect this morning.

Senator SYMINGTON. That is correct. That is what I was trying to present to you.

Senator JOHNSON. Have you concluded Senator Case?

Senator CASE of South Dakota. Yes; I have. Thank you, Mr. Chairman.

Senator JOHNSON. Senator Smith?

Senator Bartlett?

Senator Wiley?

Senator Magnuson?

Senator Martin?

Senator Anderson?

Senator Case of New Jersey?

Senator Kerr?

Senator Young?

Senator Dodd?

Senator Cannon?

Senator Case?

Counsel?

Mr. WEISL. I just want to make the record straight and complete because I recognize that as part of my duty.

General White, you stated in reply to a question that the budget provided amply for limited war. Would you please give the committee a definition of what you consider a limited war?

General WHITE. I consider a limited war anything which does not involve the Soviet Union.

Mr. WEISL. Would you consider a repetition of the Korean war a limited war?

General WHITE. In a strict sense; yes, sir. It certainly was a limited war.

Mr. WEISL. Would you agree to that, Admiral Burke?

Admiral BURKE. That the Korean war was a limited war? Yes.

Mr. WEISL. And if it were repeated today, it would be considered a limited war?

Admiral BURKE. Yes, sir.

Mr. WEISL. On the question of missiles, General White, there was some testimony concerning the allies having in the future some IRBM missiles. I'd like to straighten the record out on that. The British are the only NATO nation that have accepted IRBM missiles.

General WHITE. I believe that is correct, sir.

Mr. WEISL. And the crews are being trained in this country?

General WHITE. Some have been trained here and others are in training in the United Kingdom.

Mr. WEISL. And there is no warning system against the approach of a ballistic missile?

General WHITE. No, as far as I know. We certainly have none, and I do not believe the British have.

Mr. WEISL. And the control of that missile is divided between the British and ourselves?

General WHITE. I think that is an international question that I would prefer not to answer in open session, sir.

Mr. WEISL. Isn't it a fact that after the Thors and the Jupiter, this phase of the production is through, that we will discontinue the manufacture of Thors and Jupiters?

General WHITE. Under the present program that is my understanding, sir.

Mr. WEISL. In order to make the record a bit more complete on the economic question—and I won't take much time on that—I would like to read one sentence from the latest issue of the Committee on Economic Development:

Periodically the timid suggestion comes from many quarters that high expenditures for national defense might lead the country to economic stagnation or collapse.

A realistic appraisal of the situation shows that this fear has been greatly exaggerated. The truth of the matter is that the American people will have to decide for themselves what they think their security is worth, but they can afford whatever has to be spent in the cause of national defense.

You agree with that, don't you?

General WHITE. I cannot help but agree with that, sir.

Mr. WEISL. And I would like to put in the record a statement made by President Eisenhower's scientific adviser in a letter to the President, and I refer to the letter sent by Dr. Waterman, Director of the National Science Foundation. In that letter he stressed the progress that the Russians were making in technology and science, and that they were fast overtaking us, and he makes this significant statement to the President:

A grave danger here is that for reasons of economy we shall fall short of developing our capabilities in science and technology.

Do you agree with that?

General WHITE. Are you asking me, sir?

Mr. WEISL. Yes.

General WHITE. I agree that this country must put ever-increasing emphasis on scientific education and on scientific matters.

Mr. WEISL. And back of a long-range program for the defense of the country, science and technology is the basic need, is it not?

General WHITE. It is the basic need.

Mr. WEISL. I think that is all, Mr. Chairman.

Senator JOHNSON. Any other questions?

Senator Stennis, do you have any questions? Do any other Senators have any questions?

Gentlemen, we deeply appreciate your coming here.

You have been thorough in your answers, and frank and candid. We will benefit from your recommendations. I think your testi-

mony will go into the homes of most thinking Americans and I am sure you have made a contribution to the peace that we all seek so much.

We are proud of you, and we appreciate your willingness to come here and speak frankly and candidly.

Our next witness will be General Schriever, Maj. Gen. Bernard A. Schriever, commander of the Ballistic Missile Division.

General Schriever.

General Schriever, will you raise your hand and take the oath?

Do you solemnly swear that the evidence you give to this committee on the inquiry now underway will be the truth, the whole truth, and nothing but the truth, so help you God?

General SCHRIEVER. I do.

TESTIMONY OF MAJ. GEN. BERNARD A. SCHRIEVER, COMMANDER, AIR FORCE BALLISTIC MISSILE DIVISION

(The biography of General Schriever is as follows:)

MAJ. GEN. BERNARD A. SCHRIEVER, USAF, COMMANDER, AIR FORCE BALLISTIC MISSILE DIVISION

Maj. Gen. Bernard Adolph Schriever was born in Bremen, Germany, on September 14, 1910; came to the United States with his parents in 1917; and was naturalized a U.S. citizen in 1923. He received his early schooling in San Antonio, Tex., and graduated from Texas A. & M. College Station, Tex., in 1931, with a bachelor of science degree in engineering. His master of science degree in aeronautical engineering was received in 1942 from Stanford University in Palo Alto, Calif.

General Schriever began his military career in 1931 after receiving a Reserve appointment in the field artillery upon graduation from Texas A. & M. In July 1932, he entered flight training at Randolph Field, Tex., earning his wings and commission as a second lieutenant in the Air Corps Reserve in June 1933, at Kelly Field, Tex.

His first flying duties were performed as a bomber pilot at March Field, Calif. Subsequently, he was stationed at Hamilton Field, Calif., and Albrook Field, Panama Canal Zone. In September 1937, he reverted to Inactive Reserve status and accepted a position as a pilot with the Northwest Airlines.

In October 1938, he reentered the service to accept an appointment as second lieutenant in the Regular Army and was assigned to the 7th Bomb Group at Hamilton Field, Calif. In October 1939, General Schriever was assigned to test pilot duties at Wright Field, Ohio. While at Wright Field, he attended the Air Corps Engineering School specializing in aeronautical engineering subjects, graduating in July 1941. Following this schooling, he entered Stanford University to pursue an advanced course in aeronautical engineering and in June 194.', was awarded a master's degree in mechanical engineering (aeronautical).

In July 1942, General Schriever joined the 19th Bomb Group in the Southwest Pacific. While in that theater, he participated in the Bismarck Archipelago, Leyte, Luzon, Papua, north Solomon, south Philippines, and Ryukyus campaigns. He flew 63 combat missions.

In December 1942, he became Chief of the Maintenance and Engineering Division, 5th Air Force Service Command. He held this position until August 1943, when he was appointed Chief of Staff, 5th Air Force Service Command. In September 1944, he assumed command of the Advanced Headquarters, Far East Air Service Command, and supported theater operations from bases in Hollandia, New Guinea, Leyte, Manila, and Okinawa.

General Schriever was assigned to Army Air Force Headquarters in January 1946, as Chief, Scientific Liaison Section, Deputy Chief of Staff, Materiel. He held this position until August 1949, when he entered the National War College. Following his graduation in June 1950, he returned to Headquarters, USAF, to become assistant for evaluation, Office of the Deputy Chief of Staff, Development. Assistant for development planning (an outgrowth of the Evalu-

tion Office) was his next assignment in January 1951. In May 1954, he became assistant to the commander, Air Research and Development Command, in Baltimore, Md. In August 1954, though retained as assistant to the commander, ARDC, General Schriever assumed command of the Western Development Division, Headquarters, ARDC (redesignated Air Force Ballistic Missile Division), located in Los Angeles, Calif. As commander, Air Force Ballistic Missile Division, General Schriever has immediate control and supervision over all aspects of the Air Force ballistic missile program as well as several space projects directed by the Advanced Research Projects Agency, Department of Defense.

His awards and decorations include the Distinguished Service Medal, Legion of Merit, Air Medal, Purple Heart, and two unit citations. He is rated a command pilot.

He was promoted to first lieutenant in October 1937; to captain in April 1942; to major in June 1942; to lieutenant colonel in March 1943; to colonel in December 1943; to brigadier general on June 23, 1953; and to major general on December 13, 1955.

General and Mrs. Schriever were married in January 1938, and now have three children, Brett, Dora, and Barbara. Mrs. Schriever is the former Dora Brett, daughter of Lt. Gen. George H. Brett, USAF, retired.

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Senator JOHNSON. General Schriever, the committee is delighted to welcome you to its meeting this afternoon. We have followed with great interest and concern the very vital work in which you engage.

Counsel is prepared to examine you and will you proceed, Mr. Vance?

Mr. VANCE. General Schriever, for a number of years you have been head of the Air Force's ballistic missile program, and know as much as anyone in this Nation with respect to ballistic missiles.

Would you tell us what there is in the nature of a ballistic missile system which makes it different in terms of threat from other weapons systems such as the manned bomber?

General SCHRIEVER. Well, of course, the nature of a ballistic missile is a matter of time. It puts a new dimension on time. It places an overwhelming importance on the matter of initiative and surprise. This, of course, in the hands of an aggressor nation, will make our forces in the future under such a threat, much more vulnerable, and this, of course, in turn endangers our deterrent posture and our survival.

Mr. VANCE. Is it correct, General, that where you have ballistic missiles with nuclear warheads, and we think in terms of fighting a war like that, it will not be like any other war that has been fought in the past?

In other words, we do not have the time to gather together and strike back that we had before, is that correct?

General SCHRIEVER. Not unless our forces are so tailored that they could in fact absorb an initial attack and strike back with a strong retaliatory blow.

I think this becomes perhaps the most important thing as we look into the future.

Mr. VANCE. We have heard a lot of talk about a deterrent retaliatory capability, and I think we ought to get a definition of what we mean by that.

In other words, what are the elements of a deterrent retaliatory capability?

WE MUST BE PREPARED TO ABSORB THE FIRST BLOW

General SCHRIEVER. Well, I think that in view of the nature of this Nation, our planning has to be on the basis that we will not be the aggressor.

On that basis, we have to be prepared to absorb the first blow. I think the overwhelming aspect of retaliation is that we must have the ability after absorbing the first blow to retaliate in overwhelming force, and secondly, the enemy must know that we can.

Mr. VANCE. General, let me ask you this: In terms of deterrent retaliatory capability, do we in your opinion have an adequate force buildup for our ICBM's?

Gneeral SCHRIEVER. I would like to evade that question a little by saying that I am not the one who makes the final decision as to what the total deterrent capability of the Nation is under——

Mr. VANCE. Yes, General, but you know as much about ballistic missiles as anyone in the Nation, and what we would like is your opinion.

General SCHRIEVER. I will give you my opinion in terms of the ballistic missile capability.

In an era where survival becomes the most important factor, not just security, the risk becomes greater than at any other time in history, and I think we should do everything we can to reduce that risk to a minimum.

We could build larger ballistic missile forces if decisions were made to do so, which would increase our retaliatory capability down the road timewise.

Mr. VANCE. I am not sure you have answered my question, General.

What I would like is an answer this this question:

In your opinion, have we an adequate force buildup for the ICBM's planned?

General SCHRIEVER. I am not trying to evade you, but in deciding what constitutes an adequate deterrent capability 5 years from now, we have to consider other forces that are in the program, say the Polaris, our aircraft, and so forth.

WE SHOULD BUILD GREATER BALLISTIC MISSILE FORCES

In my opinion, in view of the very dangerous situation with respect to a ballistic missile threat, I think we should build greater ballistic missile forces.

Mr. VANCE. Without going into classified figures, do we have the capacity to produce more missiles than we are producing or planning to produce under current plans?

General SCHRIEVER. We have the capacity to produce more missiles than current planning calls for; yes.

Mr. VANCE. What is the order of magnitude of the increase that we would make?

General SCHRIEVER. This, of course, is a factor that works with time.

Mr. VANCE. General, let me interrupt a second.

To make the record clear, I want to state that I am referring to ICBM's.

General SCHRIEVER. Yes.

Mr. VANCE. Did you so understand my questions?

General SCHRIEVER. Yes, that is right.

I interpret them that way.

In view of the fact that I believe it is generally known what our force plan is at the moment, I would rather not answer that specifically, but we can increase the numbers by a considerable amount.

Mr. VANCE. What would the pacing items, or the principal limiting factors be if a decision was made to accelerate the ICBM program?

General SCHRIEVER. It is not production.

The pacing items are things that relate to bringing missiles into an operational state.

This means base construction, it means training, it means the setting up of new units, and I want to say that we are introducing this type of weapon for the first time in the history of this country, and it requires an entirely new operational environment—the lead times are longer—in the training, the establishment of training facilities, the construction of the bases, and these other things.

Now I want to say that since I have been responsible for the ballistic missile program, I have also been responsible for the planning and programing for doing all of these things, and we have maintained an integrated program in that sense from the start.

Mr. VANCE. If it does not lap over into the area of classified information, could you give us the figures on the amount of time which it required in respect of construction of sites for ballistic missiles?

LEAD TIME FOR SITES ANTEDATES MOVING DIRT

General SCHRIEVER. It is a little bit wrong to think of it only in terms of construction where you start moving dirt. Actually, there is the matter of establishing design criteria, there is the matter of actually designing specifically for the base where you are going to locate the missiles.

Then the letting of the contract, and the construction—all of that takes——

Mr. VANCE. Let's take the design phase.

Approximately how long would that take?

General SCHRIEVER. The design phase runs from 5 to 6 months.

Mr. VANCE. All right, then we will come to the construction phase.

How much time would we require for that?

General SCHRIEVER. Our best estimate is 15 to 17 months, and that is on a highly compressed construction program.

Mr. VANCE. When you have finished the design phase and the construction phase, are you all through? Can you then get in and get ready to fire the missiles or does something more have to be done?

General SCHRIEVER. No. There is the so-called installation and checkout phase, and during this phase, which takes approximately 9 months of which part of it is overlapping, however, with the construction program, we install all of the equipment that supports the missile, that makes it operational.

In other words, a ballistic missile requires a great deal of ground support equipment, and the contractors under Air Force supervision do the installation and checkout.

Mr. VANCE. Then if my mathematics is correct, we are talking something in the order of 30 months or more.

General SCHRIEVER. That is correct.

Mr. VANCE. Now how about the training of crews? You said that was one of the basic items. Would you care to comment on that?

General SCHRIEVER. Yes. That is a dynamic situation, however, with time.

Once you have your training facilities established, then the actual crew training, individual and crew training and unit training is cut down.

TRAINING PROGRAM FOR CREWS COVERS 30 MONTHS

Well, it is not really cut down, but the portion becomes the pacing item. The pacing item now in establishing a new training capability is that you have to build training facilities, you have to establish personnel training requirements, you have to set up courses.

That, again, in the first go-around in establishing a training program, is in the order of 30 months.

Mr. VANCE. Now if it is going to take 30 months for the training and construction work, if we are going to make an increase or an acceleration in our ICBM program, how soon do we have to make a decision?

General SCHRIEVER. Well, in considering all of these factors, and we have made, of course, a number of studies as to what our maximum capabilities might be, we could make a decision to tentatively increase the force and save that decision with only a very small amount of funds during the remainder of this fiscal year.

Mr. VANCE. Approximately how much?

General SCHRIEVER. Oh, I'd rather not state that in open session. But the moneys required in fiscal year 1960 would be considerably greater. However, they again go up progressively. During the first quarter it is fairly low. The second, third, and fourth quarters of the next fiscal year the costs would be very high.

Mr. VANCE. Do I correctly summarize your testimony, then, in saying that it is your view that we have the capacity to accelerate our ICBM program if we make decisions forthwith, and that in your view it should be done?

General SCHRIEVER. I think serious consideration should be given during the next few months for an acceleration, yes.

Senator JOHNSON. Counsel, Gen. Maxwell Taylor, the Chief of Staff of the U.S. Army, has just completed testifying on the House side, and we have arranged to hear him as soon as he was available. He has other appointments and if it is agreeable to General Schriever and to counsel, I should like to ask General Taylor to come forward and take the stand.

General, will you raise your hand? Do you solemnly swear that the testimony you are about to give this committee is the truth, the whole truth, and nothing but the truth?

General TAYLOR. I do.

Senator JOHNSON. General Taylor, the committee is delighted to have you appear this afternoon as a witness. We have heard from your associates on the Joint Chiefs of Staff. We regret that you could not be present because of testifying before another committee when they were here.

Counsel will examine you and then the Senators will ask you any questions that may occur to them.

TESTIMONY OF GEN. MAXWELL D. TAYLOR, CHIEF OF STAFF, U.S. ARMY

(The biography of General Taylor is as follows):

GEN. MAXWELL DAVENPORT TAYLOR, CHIEF OF STAFF, U.S. ARMY

Maxwell D. Taylor was born in Keytesville, Mo., August 26, 1901. He attended Northeast High School and Kansas City Junior College, Mo., was graduated from the U.S. Military Academy, West Point, N.Y., No. 4 in the class of 1922, and was commissioned a second lieutenant in the Corps of Engineers.

He was first assigned to Fort Humphreys, Va., where he was a student officer in the Engineer School. Upon completion of this course in March 1923, he was transferred to the 17th Engineers at Camp Meade, Md. In May 1923, he went to Schofield Barracks, Hawaii, for duty with the 3d Engineers. During his tour in Hawaii, he was for a time aide to Maj. Gen. William R. Smith, commanding general of the Hawaiian Department and of Schofield Barracks in July 1925.

In June 1926, he returned to the United States and was stationed at Camp Lewis, Wash., with the 6th Engineers. He transferred to the field artillery in July 1926 and served with the 10th Field Artillery until June 1927, when he sailed for Paris, France, to study the French language in preparation for service at the U.S. Military Academy.

Returning to the United States the following September, he was ordered to the U.S. Military Academy at West Point, N.Y., as an instructor of French and subsequently was assistant professor of Spanish. In August 1932, he entered the Field Artillery School at Fort Sill, Okla. In August 1933, he was ordered to Fort Leavenworth, Kans., to attend the Command and General Staff School.

Upon his graduation from the 2-year course in June 1935, he sailed for Japan and the following November was stationed with the American Embassy at Tokyo as a student of the Japanese language. In September 1937, he was detached for duty at Peking, China, as assistant military attaché, and in December of that same year returned to his post in Tokyo.

In June 1939, he sailed for the United States to enter the Army War College, Washington, D.C. At the completion of this course, in June 1940, he went on a special mission to nine Latin American countries in connection with hemisphere defense.

In December 1940, he assumed command of the 12th Field Artillery Battalion at Fort Sam Houston, Tex. In July 1941, he returned to Washington, D.C., for duty in the Office of the Secretary of the General Staff, where he remained until July 1942, when he was transferred to Camp Claiborne, La., as chief of staff of the 82d Infantry Division. In this capacity, he personally assisted in the development of the first airborne divisions of the Army, becoming artillery commander of the 82d Airborne Division on December 4, 1942.

He went overseas with his division in March 1943 and took part in the Sicilian and Italian campaigns. In "Crusade in Europe," General Eisenhower records General's Taylor's mission to Rome on September 7, 1943, when he was sent by British PT boat and Italian corvette through enemy lines to Rome 24 hours ahead of the planned airborne operation and scheduled invasion of Italy, to confer with leading Italian authorities in order to inform the Allied commander whether or not an airdrop on the airfields about Rome should be attempted in view of possible violent German reaction. General Eisenhower wrote on page 184: "The risks he (General Taylor) ran were greater than I asked any other agent or emissary to undertake during the war—he carried weighty responsibilities and discharged them with unerring judgment, and every minute was in imminent danger of discovery and death." During the Italian campaign, General Taylor was initially the senior U.S. member of the Allied Control Commission in contact with the Italian Government. A year later, in March 1944, he became commanding general of the 101st Airborne Division, which he led in the airborne invasion of Normandy on June 6, 1944; the airborne invasion of Holland on September 17, 1944, and the campaigns of the Ardennes and central Europe.

In September 1945, he returned to the United States for duty as Superintendent of the U.S. Military Academy at West Point, N.Y.

In January 1949, he was assigned to European Command Headquarters at Heidelberg, Germany, as Chief of Staff, and the following September became the first U.S. Commander, Berlin. He was appointed Assistant Chief of Staff for Operations, G–3, in the Department of the Army, February 13, 1951.

On August 1, 1951, General Taylor became Deputy Chief of Staff for Operations and Administration of the Army. He was appointed to succeed Gen. James A. Van Fleet as commanding general 8th U.S. Army in Korea, and assumed command on February 11, 1953.

Under General Taylor, 8th Army engaged in some of the bitterest fighting of the Korean war, and when the armistice was signed on July 27, 1953, United Nations troops stood well above the 38th parallel. Following the armistice, General Taylor instituted a vigorous training program for all troops under his command including the Republic of Korea Army.

Four historic postarmistice operations were carried out during General Taylor's Korean service: Little Switch in April 1953, a prisoner exchange in which 684 sick and wounded were returned to the U.N.; Big Switch in August–September 1953, a POW exchange that returned 12,773 U.N. troops; Operation Comeback, the repatriation in January 1954 of 21,797 Chinese and North Koreans who renounced communism; and Operation Glory, the exchange in September 1954 of 4,176 U.N. and 13,543 Chinese Communist and North Korean bodies of personnel killed in combat.

Under General Taylor's supervision, the Republic of Korea Army was built into a 20-division force, and plans were laid for a ROKA reserve force of 10 divisions. The 1st ROK Field Army and the 2d ROK Army (Zone of the Interior) were activated, together with the III, V, and VI ROK Corps and the 20th, 21st, 22d, 25th ,26th, 27th, 28th, and 29th ROK Divisions.

In November 1953, General Taylor initiated the Armed Forces assistance to Korea program, under which the Armed Forces in Korea extended material assistance to the Korean people in rebuilding their nation. Army supplies totaling $20 million supported the program which became, second only to combat readiness, a major mission of 8th Army. By the time General Taylor left Korea, more than 1,200 separate projects were completed and another 750 begun.

To improve the welfare of his own troops, in December 1953 General Taylor intiated a large-scale educational program to give all noncommissioned officers at least an eighth grade education and all other soldiers at least a fourth grade education. By November 1954, nearly 18,000 had raised their educational level to minimum standards.

Effective November 20, 1954, General Taylor was placed in command of all ground forces in Japan, Okinawa, and Korea when he took command of the combined staffs of the U.S. Army Forces, Far East, and 8th U.S. Army, with headquarters at Camp Zama, Japan.

Effective April 1, 1955, General Taylor was named commander-in-chief of both the Far East Command and the United Nations Command.

On June 30, 1955, General Taylor was sworn in as Chief of Staff, U.S. Army.

General Taylor and his wife, the former Miss Lydia Harper, of El Paso, Tex., and Washington, D.C., have two sons, John and Thomas.

General TAYLOR. I am sorry to be late in reporting.

Mr. WEISL. General Taylor, you signed the memorandum of January 19 which stated that the Joint Chiefs considered the budget as presented adequate for the defense of the Nation, reserving certain findings of some segments of your respective services. When did you sign it?

General TAYLOR. On the 20th of January.

Mr. WEISL. How long did you consider it?

General TAYLOR. I think that the matter was under discussion, I would say, for 10 days or more, perhaps longer than that. I would have to refresh my memory.

Mr. WEISL. How long did you have the budget in your hands for review and consideration?

General TAYLOR. Not very long.

I would say approximately 2 days after it was finalized and before it was presented to the National Security Council.

Mr. WEISL. Did you all sign it at a meeting or did you sign it separately?

General TAYLOR. No, it was circulated.

Mr. WEISL. In your judgment, what reservations do you think were omitted that in your opinion were needed for the proper defense of the country?

General TAYLOR. Speaking for Army programs, I had reservations in my mind with regard to our modernization program, to the anti-missile missile, the so-called Nike-Zeus program, to the personnel strength of Active Army and of the Reserve Forces, and also to the surface-to-air missiles related to the supersonic bomber threat.

Mr. WEISL. And do you consider those reservations that were omitted from the budget vital for the performance of your role and mission in the defense of the country?

General TAYLOR. I would not suggest that there is not support for those programs in this budget. It is rather the question of emphasis which I had in mind.

Mr. WEISL. You testified, General Taylor, in our previous hearings, that the American Army had not modernized its weapons systems or its weapons. Is that still true?

General TAYLOR. We are, of course, trying to modernize as rapidly as our resources will permit.

Each year we buy a certain amount of new equipment. It is not at a rate, however, which I would consider optimum.

Mr. WIESL. The testimony given at those hearings was that the Russian weapons, namely, artillery, tanks, machineguns, missiles, rockets, could outrange and outgun the weapons that the U.S. Army had. Is that still true?

RUSSIANS HAVE COMPLETELY REPLACED WORLD WAR II EQUIPMENT

General TAYLOR. It is true in certain categories. They still have longer range missiles in the hands of their army than we have in the hands of our Army.

It is also true that they have completely replaced their old equipment since World War II. We have done that only in certain categories.

Mr. WEISL. Haven't they twice replaced their equipment since World War II?

General TAYLOR. I couldn't verify that. We know there are second generation post-World War II items, but how far that second round has gone, I frankly do not know.

Mr. WEISL. When you made the recommendation that we modernize the weapons of our Army, you believed that that was necessary?

General TAYLOR. I did.

Mr. WEISL. And you did not pad the budget any in making that request?

General TAYLOR. I beg your pardon?

Mr. WEISL. You did not pad your request in any way, did you?

General TAYLOR. No, sir. We have a so-called 5-year modernization program, and I presented a 1-year increment for that program.

Mr. WEISL. And what did that 1-year increment amount to?

General TAYLOR. It amounted to approximately $3 billion in procurement, in hardware.

Mr. WEISL. And how much of that was allowed in this present budget?

General TAYLOR. Stripping out a couple of items which really do not bear, comparable figures would be $2.8 billion for the hardware we would like to have had; $1.4 billion is the money we are actually getting.

Mr. WEISL. Isn't the $1.4 billion money that you are actually getting necessary to replace the wornout weapons that the Army now has?

General TAYLOR. Actually, the replacement money, which we have available to replace wear-out and obsolescence, is $1.19 billion in this particular budget.

We estimate that out of our $14 billion inventory, about 10 percent should be replaced each year, which gives us an annual requirement for about $1.4 billion for replacement. That figure can be related to the $1.19 figure which is in the actual budget.

Mr. WEISL. So that in the actual budget you do not even get enough to replace your wornout equipment.

General TAYLOR. If our figures are correct, our estimate for wear-out, it is not quite enough.

Mr. WIESL. Aren't your figures correct?

General TAYLOR. Of course it is projection, sir. When I say 10 percent on the average should be replaced, that is a rough rule of thumb, and for specific items would not stand up, I am sure.

Mr. WEISL. What percentage of the Army weapons are World War II or prior to World War II weapons?

General TAYLOR. About $5 billion worth of the material in our $14 billion inventory.

Mr. WEISL. And what percentage of the Army weapons are Korean and pre-Korean weapons?

General TAYLOR. Sixty percent of the Army's weapons and major items of equipment are Korean and post-World War II models.

Mr. WEISL. How much of a budget did your staff recommend to you that was necessary for the performance of your role and mission?

General TAYLOR. We have had what we call our objectives program, which was hardly a formal budget, but one which we prepared in anticipation of the budget.

FIGURE SUBMITTED TO HIM WAS ABOUT $13.6 BILLION

Initially as I recall the Army figure submitted to me was about $13.6 billion, which I and my immediate associates reduced to about $12.5 billion. I am using direct obligation figures.

Mr. WEISL. And of the 12.5, how much was finally allowed?

General TAYLOR. I want to make clear, sir, that we did not submit a formal budget, but rather the objectives figure was the 925,000-man Army, 700,000-man Reserve, and the $12.5 billion in direct obligation excluding the Nike-Zeus program.

The final budget figure for obligation is 9.907. That includes Zeus.

The $12.5 billion should have added to it about a billion more for Zeus, so that that figure, 9.9, would compare to about 13.5.

Mr. WEISL. So that what you got was $9.5 billion as against the $13.5 billion that you felt that you need?

General TAYLOR. 9.9 against 13.5.

Mr. WEISL. 9.9.

General TAYLOR. Yes.

Mr. WEISL. Did you pad the $13 billion plus budget that you felt you needed?

General TAYLOR. Not consciously, sir.

Mr. WEISL. Did you feel that it was a necessary item that you needed to perform your role and mission adequately?

General TAYLOR. It certainly was as I viewed the Army as a single service. I make that distinction because in the last analysis the overall budget must be viewed as a composite of all services.

Mr. WEISL. Therefore, as far as the Army was concerned, the budget was not adequate, was it, in your opinion.

General TAYLOR. Not within the confines of the Army budget, itself.

Mr. WEISL. You believed in the confines of the Army budget yourself.

General TAYLOR. I did, but I also recognize the limitations of looking at one service exclusively.

Mr. WEISL. Did you have an opportunity to analyze the needs of the other services?

General TAYLOR. We have been working at this business for 3½ years, so obviously we have a great deal of information about each other.

I say that, however, without suggesting that in the time available that we were able to make the kind of analysis, say, that Mr. McNeil makes at the Department of Defense level. It was rather the feel of the situation, rather than a definite budgetary analysis.

Mr. WEISL. In other words, in approving this memorandum, it was the feel of the thing that you sort of went along with?

General TAYLOR. Well, I had worked with this question of the defense budget for so many years that within the money, the overall dollars indicated on the paper, I felt convinced that we could produce programs which would cover all our requirements.

In other words, in my mind, I think there are programs probably excessive as well as programs which are probably deficient.

Mr. WEISL. Do you believe that a program which gives you weapons that are inferior to the weapons of a potential enemy is adequate to perform your role and mission?

General TAYLOR. It is not ideal, sir, but let me make it clear the Army is prepared to fight with anything that we have on hand.

Mr. WEISL. I am sure of that, but is it fair to risk the lives of our boys with inferior weapons to the weapons of our enemy, our potential enemy?

General TAYLOR. I agree.

Mr. WEISL. It is not fair.

General TAYLOR. No, sir, I feel a very deep obligation to provide our soldiers with the best weapons available.

Mr. WEISL. You consider it unreasonable and imprudent to do that, don't you?

General TAYLOR. Yes, sir, I would not suggest, however, when I indicate modernization deficiencies, that it should be done all in one year. I do feel some reasonable program should be laid out for the purpose of modernization.

Mr. WEISL. But you did suggest a reasonable program both publicly and privately, namely, that $3 billion a year should be used for 5 years for that purpose?

General TAYLOR. That is my concept of such a program.

Mr. WEISL. And that was denied?

General TAYLOR. In part.

Mr. WEISL. What part?

General TAYLOR. We did not receive all of $3 billion. We have received something like $1.4 billion.

Mr. WEISL. Isn't the $1.4 billion necessary to replace the obsolete weapons?

REQUEST INCLUDED MODERNIZATION AS WELL AS OBSOLESCENSE REPLACEMENT

General TAYLOR. Yes, sir, but the overall figure, $3 billion, also includes replacement of wear-out and obsolescence and also advances in inventory.

Mr. WEISL. What are you replacing those obsolete weapons with?

General TAYLOR. The best procurable equipment which our technology is producing.

Mr. WEISL. Are they equal to the weapons of the potential enemy?

General TAYLOR. I am sure of it.

Mr. WEISL. We have had several definitions of a limited war here, or I might say a definition of a limited war.

What is your definition of a limited war?

General TAYLOR. It is easier to say what a general war is and then say a limited war is anything else.

A general war, as I use the term, is a war between the United States and the Soviet Union in which they are directly participating and in which atomic weapons are used freely from the outset.

Mr. WEISL. Would you consider a repetition of the Korean war a limited war?

General TAYLOR. Definitely, under the current definition used in the Joint Chiefs of Staff.

Mr. WEISL. Do you consider the U.S. Army equipped to fight a limited war today?

General TAYLOR. Yes, sir; we are organized, trained, we make our plans, we buy our equipment with that contingency in mind.

Mr. WEISL. Do you have the necessary airlift to efficiently fight a limited war?

General TAYLOR. The question of airlift sufficiency in limited war is hard to answer. It is difficult because there are so many limited war situations of variable sizes.

Also, it is hard to know what airlift the Army would have available at a given time.

The Joint Chiefs of Staff would decide that matter at the time. I have made a great many studies of hypothetical limited war situations and I conclude that in the small ones we would have enough airlift and in the big ones we would not.

Mr. WEISL. Did you consider the Korean war a big one or a small one?

General TAYLOR. A big one.

Mr. WEISL. You would not have a sufficient airlift to efficiently or properly fight that kind of a war?

General TAYLOR. Of course the Korean war broke out under conditions where airlift was not a critical factor. We had the troops in Japan based nearby and could use sealift.

I would stress the point that in the studies I make it is an optimum combination of airlift and sealift which represents the most effective reaction in terms of time.

Mr. WEISL. Are you familiar with the statement made by your predecessor, General Ridgway, as to our capacity for limited war?

General TAYLOR. I am not sure of the one to which you refer.

Mr. WEISL. May I read it to you?

He made a statement over television on the 4th of January of this year in which he said:

The question was asked:

Do we have a combat force capable of being rushed to the scene?

General RIDGWAY. Yes, we have some forces with the requisite degree of readiness to move quickly to meet one very small war or one limited war, you might say. The basic question in my mind is in view of our worldwide commitments to allies who ring the earth, do we have a force of adequate strength, of instant readiness, and the transportation to move it quickly when the alarm bell rings, and my answer to that question would be an emphatic no.

Do you agree with that statement?

General TAYLOR. I would have to qualify it somewhat. I would agree with a great deal of it.

Mr. WEISL. Please qualify it.

General TAYLOR. I would say that before one can be dogmatic on the subject of limited war capabilities, we have to define terms. What are we talking about? What specific areas are we going into?

Mr. WEISL. Well, let's take Formosa.

General TAYLOR. If we had to go into Formosa in sizable strength, in the first place, it would be largely an air and a naval operation.

I would say this is an area in which the Army contribution would be rather small.

I can think of other areas in the world which I would not care to discuss in public where the Army contribution would be decisive.

In those cases when the studies require large bodies of Army forces, our reaction time is generally too slow. It can be improved, however, by better methods of planning, by better organization, and also by modernization of our airlift and sealift.

NOT AN ADVOCATE OF GREATER NUMBERS FOR AIRLIFT

I am personally not an extreme advocate of larger numbers of aircraft for airlift, I know I have been considered as being in favor of more airlift. I think quality in strategic airlift is perhaps more important in our strategic mobility forces than numbers.

Mr. WEISL. But do you have the quality?

General TAYLOR. There is not as much effort placed on this as I would like.

However, this requirement runs counter to other programs which are of high priority, so it is the old question of balance in the overall defense budget.

Mr. WEISL. But in order to perform your role and mission and save the lives of our boys, you feel that you have to have that quality?

General TAYLOR. I do.

Mr. WEISL. And you are not getting it?

General TAYLOR. Not as fast as I think I would like to see it come along.

Mr. WEISL. Do you think the enemy is going to wait until you get it?

General TAYLOR. I hope our deterrents in combination will always be effective.

Mr. WEISL. That is all, Mr. Chairman.

Senator JOHNSON. Mr. Russell?

Mr. Bridges?

Mr. Stennis?

Senator STENNIS. Mr. Chairman, I am going to be quite brief.

General, we went over some of these matters at preceding sessions and I am not necessarily one who is trying to raise the budget figure, not yet, anyway, but I have been thinking ever since you told us about this obolescence and wearout in your estimation costing $1.4 billion to replace it, and you have only in round numbers $1.119 billion, so that you have almost a $300 million deficit on that one item alone.

General TAYLOR. About 1.2, a deficit of about $200 million.

Senator STENNIS. All right, $200 million. That, plus the item there of such a drastic reduction in your personnel that you have to let it reach even to your combat units, either in size or number. You are greatly concerned about that part of this picture, are you not, General?

General TAYLOR. Yes, sir. I might make the point that——

Senator STENNIS. I am not trying to lead up to anything else. I just want you to express yourself openly here on how you feel about it.

GENERAL TAYLOR VERY UNHAPPY ABOUT REDUCTION TO 14 DIVISIONS

General TAYLOR. I thought I might make the point which we discussed before with regard to the reduction of a division in the Army structure. I have been very unhappy about going from 15 to 14 divisions. But before doing that, I culled through every noncombat type of unit in order to protect the division structure, but I was compelled by considerations which seemed to me inevitable to accept the fact we would have to reduce a division.

Senator STENNIS. Yes, but it was necessary. Even after you had combed and culled and done everything you could you did have to reach this conclusion.

General TAYLOR. 870,000, I felt, could not support more than 14 divisions.

Senator STENNIS. Back to your ground forces, the wearout and the obsolescence that you mentioned.

Will there be any real savings in deferring the purchase of modernized equipment to replace this wearout and obsolesence?

General TAYLOR. No, sir. We are just storing up our bill for the future.

Senator STENNIS. In other words, that figure 1.4 in your judgment represents the actual wear and tear that occurs in the size organization you have?

General TAYLOR. Yes, sir; consumption of things like ammunition. We burn up almost $200 million worth of ammunition a year.

Senator STENNIS. So it could therefore be classified as an essential. It is not just something you want. You are going to have to have it to replace it; isn't that correct?

General TAYLOR. I think so, sir.

Senator STENNIS. I wanted you to make that statement publicly. That is all I have, Mr. Chairman.

Senator JOHNSON. Senator Saltonstall?

Senator Symington?

Senator SYMINGTON. Thank you, Mr. Chairman.

General, let me congratulate you on your frank and forthright testimony here this afternoon. We have had quite a few wars since World War II; have we not?

General TAYLOR. Yes, sir.

Senator SYMINGTON. Is 18 the number that you estimate?

General TAYLOR. That is the score sheet; yes, sir.

Senator SYMINGTON. Have there been any nuclear weapons dropped in any of those 18 wars?

General TAYLOR. No, sir.

Senator SYMINGTON. Do you still think that the ground soldier is important to the defense of the United States?

General TAYLOR. I do.

Senator SYMINGTON. And it is important for him to have a rifle that is as modern and as up to date as it is possible for a rich country like this to give him?

General TAYLOR. I would say a rifle and any other equipment.

Senator SYMINGTON. How many divisions do we have in Germany?

General TAYLOR. We have five divisions.

Senator SYMINGTON. How many do we estimate the Russians have against those five?

General TAYLOR. I am reflecting on the fact we are in open session.

Senator SYMINGTON. Then if you do not want to answer that——

General TAYLOR. I think I had better not.

Senator SYMINGTON. The M–1 rifle is a good rifle; is that correct?

General TAYLOR. Yes, sir.

Senator SYMINGTON. The M–14 rifle is a much better rifle; isn't that correct?

General TAYLOR. It is somewhat better; yes, sir.

Senator SYMINGTON. When did we first have the M–14 ready to go into production?

General TAYLOR. We are getting our first increment of 120,000 out of the fiscal 1960 money.

Senator SYMINGTON. And what is our plan for replacing the older rifle with the newer rifle?

General TAYLOR. We will do this progessively; giving priority to our overseas deployment.

AT PRESENT RATES OF PURCHASING MODERNIZATION WILL TAKE SOME YEARS

Senator SYMINGTON. How many years will it be before our Army is equipped with the modern rifle?

General TAYLOR. It will take some time. Again, I am deliberately being vague in answering. It will take some years at the present rate of purchasing.

Senator SYMINGTON. If we have the right as a government to draft these boys off the farms and out of the cities to come into the Army and be in a uniform when they do not want to leave their homes and jobs, don't you think we have the duty to give them the best possible equipment so that they will have the best chance to come back home?

General TAYLOR. I have indicated my feeling of deep responsibility in the matter, Senator.

Senator SYMINGTON. On that basis, don't you think it is proper that every American combat soldier should have modern equipment?

General TAYLOR. Yes, sir.

Senator SYMINGTON. Thank you.

In a talk you made sometime back, you emphasized the importance of mobility. We developed two new airplanes, the C–132 and C–133, to give mobility to the Army. The C–132 was the most modern but the program for it was canceled.

The justification for that action was on the basis that we intended to concentrate on the C–133. Then it was found that we planned to build only a very few C–133's.

To the best of my knowledge those are the only two strategic aircraft ready for production. Do you know if we are planning to build any strategic airlift planes at this time?

General TAYLOR. Of course General White is much more qualified to testify on this than I am.

I understand there is some Boeing–707's in this coming budget.

Senator SYMINGTON. 707's?

General TAYLOR. Yes.

Senator SYMINGTON. That is a jet commercial plane or KC–135 tanker; is it not?

General TAYLOR. Yes.

Senator SYMINGTON. I am talking about something with a longer range than the C–119's and C–124's.

When it comes to new strategic airlift, the Army is again being left out in the cold, is it not, to the best of your knowledge.

NO MAJOR PURCHASING FOR STRATEGIC AIRLIFT

General TAYLOR. I know of no major purchasing for strategic airlift.

Senator SYMINGTON. Thank you, General.

How many divisions did we have in the Army at the end of the Korean war?

General TAYLOR. Twenty divisions.

Senator SYMINGTON. And how many do we have now?

General TAYLOR. We have 15, but very shortly we will be at 14.

Senator SYMINGTON. So we cut our Army's strength, despite the 18 wars and the large number of commitments we have around the world. The Army has been cut one-third in recent years; is that correct?

General TAYLOR. In division strength.

Senator SYMINGTON. In division strength.

General TAYLOR. Numerically it is from about a million and a half down to 870,000.

Senator SYMINGTON. Not counting the Communist divisions and squaring off the satellite divisions against our friends' and allies' divisions—would you care to give the number of divisions the Russians have, now that we have been told we should do something about Berlin of next June 1?

General TAYLOR. There are 175 divisions in the Soviet Army. There is no question about the preponderant strength of the Russians in terms of divisions.

Senator SYMINGTON. And I presume the same would be true of any Chinese divisions, would it not?

General TAYLOR. The number of Chinese Communist divisions are classified.

Senator SYMINGTON. I have no further questions, Mr. Chairman.

Senator JOHNSON. Senator Smith?

Mr. Bartlett?

Senator BARTLETT. No questions.

Senator JOHNSON. Mr. Wiley?

Mr. Magnuson?

Mr. Martin?

Senator MARTIN. General, if we were to equip your planned 14-division Army with the M–14 rifle to its full needs, its full equipment, how long would it take for you to furnish them with the M–14 complete equipment?

IMPROVEMENT OF RIFLE SITUATION COULD BE DONE AT EXPENSE OF OTHER PROGRAMS

General TAYLOR. Based on the present annual production capability, it will require 7 years to equip 14 divisions with the M–14 rifle and 7.62-millimeter ammunition. With an expenditure of $3.5 million in fiscal year 1960 to increase the production capability of existing commercial producers, the 14-division Army could be equipped in a 5-year period.

I would just make this point, sir: It is our own decision that is holding back on production of the M–14. We have certain procurement funds and we could go faster with the M–14 if we wanted to. We could do so, however, at the expense of other programs, so I am not suggesting anyone has imposed this rate of production on the Army.

Senator MARTIN. I do not know what amount of money these questions involve.

General TAYLOR. To completely equip a 14-division Army with the M–14 rifle and 7.62-millimeter ammunition, including in place reserves, depot stocks, intransit levels, and maintenance stocks, will cost a total of $410 million for the rifles and ammunition.

Senator MARTIN. We are talking about going into a crash program on Infantry. I understand Infantry a little better than the Air Force.

Senator JOHNSON. Senator Case, New Jersey?

Senator CASE of New Jersey. No questions.

Senator JOHNSON. Senator Kerr?

Senator Young?

Senator Dodd?

Senator DODD. I have a question or two, Mr. Chairman, that I would like to ask.

General, I have listened all day or most of it, and I am trying to come to some conclusions in my own mind. I would like to ask you a couple of questions, and I hope that you can help me to think clearly about what I have heard.

I think it is fair to say—and I will be happy to be corrected by the chairman or anyone else on the committee if I am in error about this—we heard from Admiral Burke, General Pate, and General White. As I understood them, they all said that they submitted their figures and at the time of the submission they thought this was the amount adequate for the defense of the country.

In each case their figures were reduced. My reasoning is that they must believe that the amount of money made available is inadequate for their own service. Then from that I listened and I got the impression that they feel this inadequacy will be remedied by an inexplicable manner to me, the adequacy of another service, and I have drawn the conclusion that everybody has told us that in his own individual judgment—that is, each one of the Chiefs has told us—that the figures are inadequate for him and his service, and I do not know how we arrive at the conclusion that they can be adequate on an overall basis.

Do you understand what is troubling me?

HOW DO FOUR INADEQUACIES ADD UP TO ONE ADEQUACY?

General TAYLOR. Yes, sir. I do not know that I have an entirely adequate reply, Senator Dodd, but it is certainly true that each one of the service Chiefs inevitably become immersed with his own service requirements.

Senator DODD. Excuse me. It is a little more than that as far as I am concerned. What I am trying to figure out is how, by four inadequacies, we reach one adequacy. [Laughter.]

I do not think it is humorous. I am new here and I am trying to find out.

General TAYLOR. Yes, sir.

Senator DODD. According to what I have learned, by logical reasoning it makes it impossible for me to understand that kind of calculation.

General TAYLOR. I think you emphasize the very difficult task of the Secretary of Defense. He receives these very sincere estimates from the service Chiefs. He becomes the judge over an issue which is highly complicated and very difficult, and I respect his judgment when he finally has made his decision.

Senator DODD. But that does not make it adequate, does it?

General TAYLOR. It is probably as good an answer as anyone can give, I suggest, sir.

Senator DODD. I did not get much help. Thank you.

Senator JOHNSON. Maybe I can get a little bit. Let me see if I can, Senator Dodd.

General, from what Senator Dodd is pointing up, do you really mean that the reservation that each of you makes really means that the Secretary of Defense makes the decision as to whether the defense

program is adequate or not, and the Joint Chiefs of Staff agree not to fight that decision; isn't that about it?

General TAYLOR. As staff officers, we do what we are accustomed to in the military service. We give our best advice to the commanding general. Then he makes the decision.

Senator JOHNSON. Shall I repeat my question?

Doesn't the reservation really mean that the Secretary of Defense makes the decision?

General TAYLOR. Yes, sir.

Senator JOHNSON. As to whether the defense program is adequate?

General TAYLOR. Yes, sir; that is his business.

Senator JOHNSON. And the Joint Chiefs of Staff then sign up and agree not to fight that program.

General TAYLOR. There is no need, in my judgment, to sign any paper because of the ethics of behavior in the military service.

Senator JOHNSON. But you did sign one?

General TAYLOR. Yes, sir.

Senator JOHNSON. And what happened was that the Secretary made the decision and then you agreed to abide by it.

GENERAL TAYLOR SAYS HE WOULD HAVE BEEN IN THE SAME POSITION

General TAYLOR. Yes, sir; but I insist I would have been in the same position without the piece of paper.

Senator JOHNSON. Oh, yes, but maybe the Secretary wouldn't have. He could go around and say, "Here, this has all been confirmed and they have all agreed to this. They support it, and this is it." Now does that explain it to you, Senator Dodd?

Senator DODD. Yes, I think I understand.

Senator JOHNSON. Actually, the Secretary of Defense made this decision. I think that clears it all. And the Chiefs of Staff come along and sign up with him. I think all of them have an out if the enemy blows the whistle and we find that the situation is inadequate. They say, "Well, I told you so. As far as my service is concerned I had a reservation."

That is about what it adds up to.

I do not know whether the Secretary of Defense has made a wise decision or an unwise decision. I am not going to pass judgment on that now.

I do not know whether it is a good decision or whether it is a bad one, but it is pretty evident to me that he made it, and it is pretty evident to me that the Chiefs of Staff came along and said that, "We will go along with it and won't fight it," and this is about the net of it.

Senator DODD. Well, I guess I understand it, but I would put it a little differently. All our experts have said it is inadequate, but we will make it adequate by just calling it adequate.

Senator JOHNSON. General Taylor, had you ever signed a paper like this before?

General TAYLOR. Nothing specifically like this.

Senator JOHNSON. How did you come to sign this one?

General TAYLOR. I had no objections to signing it, sir, because it is exactly my point of view.

Senator JOHNSON. I did not ask if you had any objections. How does it happen that you did sign it? Was it suggested to you that you should sign it?

General TAYLOR. It came to me, as I recall, as a memorandum from the Chairman who indicated that the Secretary of Defense wanted our view on the overall view of the budget, and that was it.

Senator JOHNSON. Who prepared this statement?

General TAYLOR. It was probably prepared in the Joint Staff.

I know several of us made contributions or suggestions, and so forth, but I think the Joint Staff would be the correct answer.

Senator JOHNSON. Senator Cannon?

Senator CANNON. Thank you, Mr. Chairman.

General Taylor, then, as I understand it, the Secretary made the decision that you would not have your $2.8 billion this year for the commencement of your modernization program.

General TAYLOR. The Secretary of Defense makes all the decisions. That is his business, of course, and I accept that as his duty.

The action on modernization was one of the included results of his overall decision.

Senator CANNON. I understand that, but the thing that disturbs me is the fact that you have an Army that you say is not supplied with modern equipment. You have recommended a program that would supply it with modern equipment, as I understand it, over a 10-year period; is that correct?

General TAYLOR. About a 5-year period, sir.

Senator CANNON. A 5-year period?

General TAYLOR. Yes, sir.

Senator CANNON. And to do that you would have to have the 2.8 figure that you say was now reduced to 1.4?

General TAYLOR. Yes, sir.

CANNOT REPLACE OR KEEP OBSOLESCENT EQUIPMENT IN REPAIR

Senator CANNON. And the reduction to 1.4 will not even permit you to keep your obsolescent equipment in repair and replaced as it becomes worn out based on your current estimates?

General TAYLOR. Yes, sir.

Senator CANNON. So that you will not be able to proceed at all with your overall modernization program in this year's budget?

General TAYLOR. That is correct.

Senator CANNON. And in your opinion to put our fighting men on a comparable basis with those of Russia, we should have modernized equipment furnished to them.

General TAYLOR. We should be progressively modernizing, yes, sir.

Senator CANNON. And by forestalling the decision this year we are merely postponing the inevitable and leaving our men in a worse position for one more year.

General TAYLOR. I would say that is true. I would not overstate the point, however, because we do have substitute items of equipment in the hands of our troops which are thoroughly battle worthy. They are just not the latest model.

Senator CANNON. Yes, I understand that, General. Now may I ask you, was the budget and the man-size limitation of the Army the sole factor in reducing the Army's power from 15 to 14 divisions?

General TAYLOR. That is a little hard to answer without qualification. We received guidelines which set pretty definitely the expenditures we could count on for 1960. Also, the manpower that we could count on. Within those parameters we, of course, could adjust our programs pretty well as we thought fit, and we did so.

Senator CANNON. In other words, you were told that you can have so much money and you cannot go beyond that point. You can have so many men and you cannot go beyond that point. Now you figure it out as you best can as to the number of divisions you end up with. Is that a simplification of it?

General TAYLOR. It is a simplification. It is true, however, that our expenditures and our manpower were pretty well established for us.

Senator CANNON. Thank you very much.

Senator JOHNSON. Thank you, Senator Cannon.

Senator Case?

Senator CASE of South Dakota. Thank you, Mr. Chairman.

General Taylor, you made one reference to ammunition. Do the budget figures as submitted provide for normal replacement of your ammunition attrition?

NIKE-HERCULES PROJECT INCLUDED IN CUT

General TAYLOR. We are replacing those items we think should be replaced. In other words, there are some categories of ammunition which we are not too concerned about having lowered. There is a certain amount of ammunition money in this budget.

Senator CASE of South Dakota. Are you concerned, do you think there is a critical shortage of ammunition money?

General TAYLOR. No; I would not say that that is an area of primary concern.

Senator CASE of South Dakota. In the funds to which reference has been made, was there anything in there that you requested that was denied for Nike-Hercules?

General TAYLOR. Excuse me?

Senator CASE of South Dakota. Was there any denial of your request on funds for Nike-Hercules?

General TAYLOR. Yes. We have had to cut back in all of our surface-to-air missiles under what we initially proposed.

Senator CASE of South Dakota. Is there some difference of opinion in defense circles with regard to the need for Nike-Hercules as envisioned by the Army?

General TAYLOR. The Joint Chiefs of Staff have approved all the Nike-Hercules deployments which are planned. In other words, we are putting nothing in the air defense system which all the Chiefs do not agree with.

Senator CASE of South Dakota. Would any part of the difference between the 1.4 billion and the 2.8 billion represent a cutback on the Nike-Hercules which the Army wanted?

General TAYLOR. Yes; I think that some of the Hercules money is included in that figure.

Senator CASE of South Dakota. Under the Military Reorganization Act that we passed last year, where was the responsibility placed for the decision with respect to the use of Nike-Hercules and Bomarc?

General TAYLOR. The Department of Defense has taken a position on that which I think they should explain because it is a fairly complex decision. Some construction for Bomarc was authorized and some for Nike-Hercules.

I am sorry I cannot give you a detailed answer on that.

Senator CASE of South Dakota. What about a conflict between Thor and Jupiter? Who has the responsibility for making the determination?

General TAYLOR. Both missiles operationally belong to the Air Force, and they in turn get their guidance from the Department of Defense.

Senator CASE of South Dakota. It is true, is it not, that in the Military Reorganization Act the Congress provided the Secretary of Defense should make the selection of weapons when they got beyond the research and development stage when it came to operation, if there were two competing systems?

General TAYLOR. It would be more or less implied as one of the functions of the Secretary of Defense to make those determinations.

Senator CASE of South Dakota. My recollection is it is pretty well spelled out in the act itself.

General TAYLOR. I think that is implicit in his job.

Senator CASE of South Dakota. How does the fund $1.4 billion for replacement compare with what the Army has received in prior years for that purpose?

General TAYLOR. The funds received for procurement of major items of equipment for inventory since 1956, estimated from past records, are as follows: 1956, $1.5 billion; 1957, $1.4 billion; 1958, $1.2 billion; and 1959, $1.2 billion.

Senator CASE of South Dakota. Do you know of any time in peacetime prior to that when the Army received more than that?

General TAYLOR. The Army has not received more than $1.5 billion in any peacetime year since World War II.

Senator CASE of South Dakota. With respect to the paper which you signed, would you say that any of the items which you are responsible for and the reservations which you had in mind were of items which you would regard as creating a critical deficiency?

General TAYLOR. I mentioned, I believe, four areas which are obviously very important, the modernization which we have just been discussing, our personnel strengths for the active and the reserve forces, the Nike-Zeus program, and our other surface-to-air missiles.

Senator CASE of South Dakota. I think it is the record of the military services, and I would not have it otherwise, that any branch wants to have all of the materiel and the weapons that they think would be helpful and important to carrying out their roles and missions as they construe them. That did not start with the Key West Conference, but it certainly was evident following the Key West Conference and it has been since.

I think that the head of every branch of the service, not merely by reason of pride in his outfit, but by reason of his training and his background, should ask for what he thinks would make the very best outfit possible under his command.

I think you have already recognized that when you balance these up, that there may be certain phases of the situation assigned to some

other service. I have heard briefings where certain targets were mentioned which I am sure the Air Force might believe belonged to it. Some of those targets have been assigned to carrier-based aircraft, for example. When you or any other head of a service sees a deficiency or an inadequacy from the standpoint of looking at the situation from your particular viewpoint, isn't it possible that the inadequacy may be remedied by the assignment of a certain task to another service?

INADEQUACY IS REMEDIED IN ANOTHER SERVICE

General TAYLOR. Yes; I agree with what you say, Senator Case. This is nothing new this year. Every year that I have been Chief of Staff I have recommended greater forces than I have received. I quite understand the requirement of the Secretary of Defense to look over the contribution of all the services and make the final determination, and nothing I am saying here today suggests that I am resisting that determination.

Senator CASE of South Dakota. When the other members of the Joint Chiefs of Staff were before the committee earlier this afternoon, I ventured the observation that we could think in terms of desirability, the essentiality, or the criticality of these items. Are you aware of any items that were in your mind when you signed the reservations that you would characterize as a critical deficiency as contrasted with essential or desirable?

General TAYLOR. I have a little trouble with your adjectives because I think they may mean different things to different people. I would say as to order of importance I have indicated the priorities: Modernization followed by the Nike-Zeus missile program are the orders in which I place them, followed by personnel requirements, followed by our surface-to-air missile needs.

Senator CASE of South Dakota. Do you place the Nike-Hercules program in the same degree of importance that you place Nike-Zeus?

General TAYLOR. I would consider Nike-Zeus to be an exceptional program, unique in every respect, because it is the only weapon, under development by anyone which offers us a defense against the ballistic missile.

Senator CASE of South Dakota. Mr. Chairman, my time is up, but I hope we will go into executive session and we might explore the Nike-Zeus matter a little bit further.

Senator JOHNSON. That is a very good suggestion.

Thank you, Senator Case.

Do any other Senators have any other questions?

Senator SYMINGTON. Mr. Chairman, I have just a couple.

Senator JOHNSON. Senator Symington.

AGREES COMMUNIST BLOC INCLUDES ALMOST 450 DIVISIONS

Senator SYMINGTON. Mr. Chairman, before asking any questions, I would like to compliment Senator Dodd for that question. I have been on this committee for some years, and I think that is as good a question as I have heard yet.

As my distinguished senior colleague from Mississippi said, you sum it up inadequacy cubed equals adequacy.

Now you mentioned that you did not want to discuss the Communist divisions. However, in a talk at Cheyenne, Wyo., on June 7, 1958, just about the time decisions were being made on the budget General Twining said:

> The total strength of the Communist-bloc armed forces consists of over 8 million men. It includes almost 450 divisions.

Do you know whether there is any reason to discredit that statement?

General TAYLOR. No; I do not. I think that is correct.

Senator SYMINGTON. I just thought we would like to have that on the record because, as I understand it, we have 14 divisions; is that right?

General TAYLOR. Yes, sir; in the Army.

Senator SYMINGTON. No further questions, Mr. Chairman.

Senator JOHNSON. Any other questions of General Taylor? Mr. Weisl?

Mr. WEISL. General Taylor, I forgot to ask you one question. In the testimony that the Secretary gave, he stated that in the event of a certain number of limited wars at one time we would have to mobilize or partially mobilize.

General TAYLOR. Yes.

Mr. WEISL. That means we would call up the National Guard and our Reserves. Under this budget has the Reserve of the National Guard been cut?

General TAYLOR. Yes, sir. The present budget is predicated on 630,000 strength for the guard and the Reserve as opposed to 700,000 in the present budget, in the present year.

Mr. WEISL. So that if we had to mobilize we would have less this year than we had last year?

General TAYLOR. Yes, sir; but our top priority units will be in good shape to go.

Mr. WEISL. And have we got weapons to equip these Reserves—National Guardsmen—in adequate quantities?

General TAYLOR. Not entirely.

Mr. WEISL. That is all, Mr. Chairman.

Senator JOHNSON. General, in your opinion is the United States doing everything it reasonably can and should do to insure the defense of this country against military aggression?

General TAYLOR. I would have to look across the board, Senator, and consider political, economic, ideological factors, all of these other things.

I know that our leaders have considered them very closely, and I respect their judgment. I feel that on balance the kind of money which goes into this budget ought to be able to defend us.

Senator JOHNSON. In your opinion is the United States doing everything it reasonably can and should do in the exploration of outer space?

General TAYLOR. I am not close enough to those programs to have an opinion. That is really not within my competence.

Senator JOHNSON. Are there any suggestions you would care to make to the committee before you conclude your testimony?

General TAYLOR. No, sir, other than to thank them for the very close attention they are paying to these very important matters.

Senator JOHNSON. We deeply appreciate your coming here. You have been very frank and candid. We are very proud that we have men like you in positions such as you occupy.

General TAYLOR. Thank you very much.

Senator JOHNSON. General Schriever, will you return to the stand? General Schriever, we want to express our deep appreciation to you for making it possible for General Taylor to come on when he arrived, so that he could go ahead and fulfill other engagements.

We are sorry to have interrupted your testimony, but under the circumstances we had agreed to hear General Taylor when he came. Counsel, will you proceed with your examination of General Schriever?

Mr. VANCE. General Schriever, to pick up, I believe you had said that we had the capacity to significantly increase our ICBM capability over current programs and plans if we acted promptly.

I believe you also said that you felt it advisable and necessary to increase these programs in order to have a proper ICBM retaliatory capability. Is that correct?

TESTIMONY OF MAJ. GEN. BERNARD A. SCHRIEVER—Resumed

General SCHRIEVER. That is essentially correct. I would like to make one statement.

When you say, "programs," I am talking about the force buildup, not the research and development effort that has been going on for the past 4 years. This has been under the very highest priority, and we have gotten all of the funds that we needed to carry this program forward as fast as we possibly could.

Mr. VANCE. Thank you, General. You called attention to the long lead time which was needed in the developing of operational ICBM's. I believe you said that if we expended a rather small amount of money, we could protect our position for a while, but that we would have to act in terms of appropriating substantial sums of money some time in the near future.

What I would like to ask you, General, do you mean that this would have to be included in the 1960 budget?

General SCHRIEVER. I say that if a plan for an increase in the ICBM forces were undertaken, it would require, if it were taken in the next few months, substantial increases in the fiscal year 1960 budget.

Mr. VANCE. And if we are going to make this decision, we will have to make it shortly; will we not?

General SCHRIEVER. This is correct. However, from a lead time standpoint very little additional funds would be required in fiscal year 1959.

Mr. VANCE. Thank you, General. Now with respect to IRBM's, do we, in your opinion, have an adequate force buildup under current plans?

General SCHRIEVER. I personally have felt that I would like to see a larger IRBM force overseas. I think that has been the national policy as a matter of fact, but there are problems involved over which the military has no control whatsoever in the IRBM field, and therefore I really can't comment on this particular program too much so far as force buildup.

Mr. VANCE. Can the IRBM be improved in its deterrent capability?

General SCHRIEVER. Yes; it could.

HARDENING WOULD INCREASE IRBM CAPABILITY

Mr. VANCE. In what way?

General SCHRIEVER. By hardening, by hardening and dispersal. Our original concept was to get IRBM capability at the earliest possible date, and as a result the current IRBM deployments to the United Kingdom are in a soft configuration.

However, they are widely dispersed. The improvement could be in hardening, which is possible. We have made detailed studies of this. And also in increased range. This is a potential that the weapon possesses.

Mr. VANCE. Are the lead times involved in this area the same as in the ICBM field?

General SCHRIEVER. Yes. When you change an operational configuration to that extent there is quite a bit of lead time involved.

Mr. VANCE. In connection with your duties as head of BMD, do you have any connection with the space program?

General SCHRIEVER. Yes. We, of course, work very closely with NASA. We are doing projects for NASA. We are responsible for the Air Force military space program, so we are directly associated with space work.

Mr. VANCE. Do you have any connection with ARPA in connection with your duties?

General SCHRIEVER. Yes. As a matter of fact, all of the military space projects that we have are under ARPA supervision.

Mr. VANCE. In other words, they have supervision of the program. Do they provide the funding for the program?

General SCHRIEVER. Not all of the funding. There is a division of funding. The bulk of the funding at the present time is ARPA funding. They fund for the so-called research and development portion of these programs.

Mr. VANCE. Who has the operating management of these programs? Does ARPA have it or does your organization have it?

General SCHRIEVER. Well, in those programs that we now have active, the Ballistic Missile Division has the operating management.

Mr. VANCE. Does that mean that you make all the technical decisions?

General SCHRIEVER. We make the technical decisions. Sometimes we get more help than we would like.

Mr. VANCE. Does ARPA make technical decisions on these programs with which you are connected?

General SCHRIEVER. I think there are several levels of technical decisions, and they of course have to make technical decisions on an overall program basis, and they do when they approve an overall program. They make a broad technical decision at that time that this is a feasible program and one that we should undertake.

BMD HAS TROUBLE AT TIMES IN MAINTAINING OWN AUTHORITY

Mr. VANCE. Do they make other technical decisions?

General SCHRIEVER. Let me say that there are times when we have had difficulty in maintaining our own authority to make these decisions down at the working level, and at lower levels.

Mr. VANCE. Can you give us an example of the type of decisions we are talking about?

General SCHRIEVER. Actually I would rather not discuss that in detail, because this would get involved in the specific programs, all of which are quite highly classified.

Mr. VANCE. Has the fact that ARPA has made some technical decisions in the area we are talking about in your opinion impeded the rapid development of your program?

General SCHRIEVER. No, I think this would be a difficult charge to make. I think it just adds to the difficulty in getting on with the job, and it takes up more man-hours to get the job done.

Mr. VANCE. General, in connection with the ballistic missile development, as I remember it one of the principal recommendations of the Von Neumann committee was that you should put the development in one highly competent organization which would have the responsibility and authority. Now is this being done in your opinion in the space field which we have been talking about?

General SCHRIEVER. No. I think this is where, from a management concept point of view, there is a different philosophy that relates to the space program than relates to the ballistic missile program. In the space program, I am talking now about the military space program, ARPA does exercise a considerable authority and detailed control in the research and development phase.

Now our main objective in the ballistic missile program was that we concentrate all responsibility, not just for research and development but also for the procurement aspects, for the operational aspects from the standpoint of establishing training programs and operational bases and so forth, and centralize that management control in one organization which would permit effective integrated planning and programing and budgeting. Having an operating agency which is separate from the services conduct a part, that is the research and development part, and then turn over to the services the operational and production end of it after the research and development has been completed does complicate considerably the management aspects.

TREND IS TOWARD ARPA INTERVENTION IN OPERATIONS

Last year when I testified on ARPA, I stated that I thought that ARPA would perform a very useful function if they were put in a category of policy and direction and program approval, but I felt that an operating agency at the Department of Defense level in research and development, an operating management organization would not be helpful to the overall speed in carrying on space work.

I still feel this way and the trend, although they have been largely in the area of policy and direction, the trend seems to be in the other direction, and this is what really frightens me in terms of the future.

Mr. VANCE. Thank you very much, General. Mr. Chairman, that is all the questions I have.

Senator STENNIS. Gentlemen, couldn't we turn these lights off. They are very severe on the witnesses and those who are waiting to testify. I think we have had enough pictures today.

All right, Senator Symington.

Senator SYMINGTON. General Schriever, how long have you been in the ballistic missile picture?

General SCHRIEVER. Quite a time. I have been responsible for the management of the program since August of 1954, but I was in the planning aspect of this type of system prior to that.

Senator SYMINGTON. So that you have been in this picture for a good many years, isn't that right?

General SCHRIEVER. About 4½ years; yes, sir.

Senator SYMINGTON. You have been in control of it for about four and a half, haven't you?

General SCHRIEVER. That's right.

Senator SYMINGTON. But you were in it for many years before that.

General SCHRIEVER. In planning phases, in all types of weapons system planning from a development standpoint I was in the Pentagon for some 4 years.

Senator SYMINGTON. And you believe that we should continue with the Atlas and the Titan both, do you not?

General SCHRIEVER. Yes, sir.

Senator SYMINGTON. I want you to know I wholeheartedly agree with you on that. It seems to me that this country can have two plants for making this type and character of weapon, world conditions being what they are. If one is better than the other, it will ultimately prove itself out, then both plants could make the better one, could they not?

General SCHRIEVER. Sir?

Senator SYMINGTON. I say if one proves out later to be better than the other or vice versa, then the two plants could go on to production of the one that was superior, could they not? You would have dispersion of your production picture.

General SCHRIEVER. Yes, this could be done. You have got the basic production base there. It would require quite a bit of additional tooling, however.

Senator SYMINGTON. I was very glad to hear the Secretary of Defense say this morning, there was more interest and they were looking more at the question of dispersion and hardening of the bases for our current ICBM program. You agree with that, do you not?

General SCHRIEVER. Yes, sir. There isn't too much detail I can give on this in an open hearing, but as you know, we started in this hardening business some 18 months or 2 years ago, and we did not know too much about it, and there has been a constant evolution in our program.

AIR FORCE IS MOVING TO INCREASED HARDNESS AND DISPERSAL

It has been very dynamic, the operational configuration plans from a dispersion and hardness point of view, and we are moving more and more in the direction of increased dispersion and hardness.

Senator SYMINGTON. It is my understanding that you believe it would be well from the standpoint of the security of the United States, based on your experience in the Air Force, for us to build more ICBM's, is that correct?

General SCHRIEVER. I have to state this, put it this way: That in a ballistic missile age, I feel that we should do everything we can to reduce the risk to our retaliatory capability, because survival is involved.

Now I am certainly not in a position to evaluate all of the weapons that are available for the deterrent force. I personally feel that we have a greater ICBM capability, and it could increase our retaliatory capability.

Senator SYMINGTON. In June of 1958, the Chairman of the Joint Chiefs made a speech in which he said:

> Of particular significance I believe has been the technological progress of the Soviet armed forces during the past year. Thus while the overall numbers may not have changed materially, the power posed by these numbers has greatly increased because of the introduction of more modern weapons.

Then he goes on later and says:

> I believe we can certainly assume that the Soviets are proceeding as fast as they can toward the development of operational long-range missiles.

Do you see any reason why, based on our industrial complex as against theirs, and our desire to protect our country against a sneak attack, why we should not be able to build a lot more ICBM's than the Soviets, if we wanted to do so?

General SCHRIEVER. This is a matter of time. Certainly we could if we wanted to put all of the industrial resources on it, but I think we must remember that they started considerably earlier on an all-out program for ballistic missiles and all the work that they did on their earlier missiles built up a base for them, which in a short term perhaps gives them a considerably greater capability.

Senator SYMINGTON. I understand that. Now let's say we went to work to have as many as they have. By what year do you think we could equal their production, just a rough guess.

General SCHRIEVER. I think that I would rather not say that in an open hearing.

Senator SYMINGTON. In other words, if we wanted to equal their production, is is fair to say, then, that we have to do considerably more than we are doing today?

General SCHRIEVER. Of course I don't know what their production is.

OUR INDUSTRIAL CAPACITY IS SECOND TO NONE

Senator SYMINGTON. But you have been advised as to what we think it probably is; have you not?

General SCHRIEVER. I have been advised as to certain estimates, yes, and certainly this country has the industrial capacity to equal the production of any country.

Senator SYMINGTON. If we decide that it is important to our security.

General SCHRIEVER. Yes.

Senator SYMINGTON. I am talking strictly about ballistic missiles.

General SCHRIEVER. Yes, and I am talking about ballistic missiles or any other thing.

Senator SYMINGTON. Thank you, Mr. Chairman.

Senator STENNIS. Mrs. Smith? Mr. Bartlett?

Senator BARTLETT. General, I am new here. They haven't even moved me toward the launching pad yet, and I know of no special reason why you ought to further my primary education, but anyway I am going to ask you this.

In the field of scientific research, how does it work out? Do you tell the scientists there is a certain job that needs to be done and instruct them to do it, or do they dream up these ideas and come to you for approval?

General SCHRIEVER. No. The military and the scientists in this country and industry have a very close working relationship, and our requirements for new weapons systems really stem from an interaction of these factors—an interaction of the military man, the scientist, and industry.

The military establishes the requirements for a new weapons system based on all of these inputs, and then, of course, the scientific world and the industry actually does developing of the system and the production of it. It is under the supervision of the military.

We have, of course, very competent scientific and technical people in blue uniforms, so we are working right with our contemporaries, you might say, and as equals. We have the overall management responsibility, and this is quite a sizable responsibility.

Senator BARTLETT. There is then no unilateral action, but sort of a desirable committee arrangement, as it were?

General SCHRIEVER. It is not committee. We are organized in the military to evaluate, assimilate all of the technology, the dynamics of technology, and we try to marry the various things, the requirement for the military mission, what technology will permit in terms of performance in the way of a vehicle, and from these considerations and interactions we actually set down a specific requirement.

Senator BARTLETT. You have furthered my education, General. Thank you, Mr. Chairman.

Senator STENNIS. Senator Case of New Jersey? Senator Young?

Senator YOUNG. No questions.

Senator STENNIS. Senator Dodd? Senator Case of South Dakota?

Senator CASE of South Dakota. Thank you, Mr. Chairman.

SAC OPERATES MISSILES DEVELOPMENT BY BMD

General Schriever, what is your relationship to the Strategic Air Command?

General SCHRIEVER. Well, by relationship is very close to the Strategic Air Command. The Strategic Air Command is the operator of the ballistic missiles that are under development under my organization.

We actually have a sizable Strategic Air Command office located physically with us on the west coast, and there isn't anything we do in terms of the program that relates to the performance of the missile, that relates to operational characteristics of the missile that we don't work out in complete harmony with the Strategic Air Command, the operator.

Senator CASE of South Dakota. Then do either you in the Ballistic Missile Division or the Strategic Air Command, either one, have a definite schedule for training of crews and the development of launching pads so that they will both be ready to receive ballistic missiles as rapidly as they come from the production plants?

General SCHRIEVER. Yes, sir. We have a completely integrated program which includes every facet of the program necessary to bring

the missile, the launch pads, the men into place at the same time for operational capability.

Senator CASE of South Dakota. Of course, I have seen some of those tables and charts, and they are very instructive, but I thought for those who haven't seen them, it is important for them to understand that this thing is geared together so that training crews, launching facilities, and missiles come out in proper quantities at the right time.

General SCHRIEVER. That is right, in accordance with the program that has been approved, and we started in on this program with complete support from the top setting up an integrated management team which would permit us to compress the time between the initiation of development to the initial operational capabilities.

Senator CASE of South Dakota. Are you on schedule?

General SCHRIEVER. In the Atlas program we are actually right on schedule in terms of the schedules we laid down in 1955.

Senator CASE of South Dakota. In the past year have you been able to shorten the time schedule for operational dates for any part of the ballistic missile program?

General SCHRIEVER. Yes. Actually we moved up our operational date, at least our target operational date, and I think we will meet it for the Thor programs in the United Kingdom during the past year.

We have not moved up the Atlas program schedule. We were unable to. I mean, it isn't because we didn't try. We had been on an extremely tight schedule ever since the program got underway.

ATLAS CAPABILITY IMPROVED IN SEVERAL RESPECTS

Senator CASE of South Dakota. In the past year have you revised the design for the Atlas launching facilities beneficially in terms of increasing dispersal, or hardening the base, or shortening the countdown time, or increasing the number of missiles that might be gotten off within the first 30 minutes?

General SCHRIEVER. Yes, sir. We have done all of those things in the Atlas program and actually have introduced a large number of them into the program during this past year.

Senator CASE of South Dakota. So that even if you might not have shortened the overall time period for Atlas to be operational as such, you have by the work of the past year been able to increase the operational capability of Atlas when it comes off in terms of number of missiles that could be launched within a given time?

General SCHRIEVER. The changes that have been made during the past year in operational configuration, which means the manner in which we deploy the missiles, have made the Atlas—will make the Atlas—a considerably more effective system; yes, sir.

Senator CASE of South Dakota. General Schriever, I had in mind, of course, particularly what has been done in the plans for the two different squadrons at Cheyenne.

General SCHRIEVER. Yes, sir; that is just the start.

Senator CASE of South Dakota. It seems to me to be a very significant gain.

General SCHRIEVER. We have gone much farther than that.

Senator CASE of South Dakota. Thank you.

Senator STENNIS. Are there any other questions?

Senator SYMINGTON. Mr. Chairman, I would like to ask a question of General Schriever.

General, are you satisfied with the structural organization and the functional setup of the present research and development program as it relates to missiles, and, if not, what suggestions would you have? Would you prefer to give those in classified hearing, if you have any?

General SCHRIEVER. No. As far as missiles are concerned, as you know from my past testimony during the past years, from the very start of the program many streamlined administrative procedures were put into effect, and we have enjoyed top priority in terms of overtime. We have gotten the funds we have asked for to proceed developmentwise.

Senator SYMINGTON. I was not talking about that part. I was talking about your relationship with these other agencies, like NASA, ARPA, research and development. Is that satisfactory to you?

General SCHRIEVER. Of course, neither NASA nor ARPA are involved in the ballistic-missile program.

Senator SYMINGTON. So that the situation as far as you are concerned is all right?

GENERAL SCHRIEVER SATISFIED WITH ORGANIZATIONAL SETUP

General SCHRIEVER. We have had no change since last year in the organizational setup that relates to the ballistic-missile program.

Senator SYMINGTON. And you are satisfied with the way it is now?

General SCHRIEVER. Yes, sir.

Senator SYMINGTON. Is it classified as to how many missiles are in a squadron? We have always known how many wings—how many planes are in a wing.

General SCHRIEVER. I am not exactly sure. I would prefer to check on this.

Senator SYMINGTON. Will you check on that?

General SCHRIEVER. Yes, sir.

Senator SYMINGTON. And see if it is——

General SCHRIEVER. If it isn't I will put it in the record.

(As subsequently supplied, the number is unclassified and is 10 missiles per squadron.)

Senator SYMINGTON. Will you let me know whether it is or it isn't?

General SCHRIEVER. Yes, sir.

Senator SYMINGTON. Thank you very much. No further questions.

Senator STENNIS. Are there any other questions? We thank you very much, General Schriever, for your appearance here. I think your testimony is very valuable.

We have Gen. Thomas S. Power now, who is commander in chief of the Strategic Air Command. General Power, will you come around please.

Do you swear the testimony you are about to give will be the truth, the whole truth, and nothing but the truth, so help you God?

General POWER. I do.

Senator STENNIS. Proceed, Mr. Weisl.

Mr. WEISL. General Power, I want to apologize to you for keeping you here so long.

Would you be kind enough, General Power, in your own words to tell the committee your role and mission as head of SAC, the problems that you face, the help that you need and other related matters so that we can get a once and for all good concept of what SAC is?

TESTIMONY OF GEN. THOMAS S. POWER, COMMANDER IN CHIEF, SAC

(The biography of General Power is as follows:)

GEN. THOMAS S. POWER, USAF, COMMANDER IN CHIEF, SAC

Gen. Thomas S. Power, commander in chief of the Strategic Air Command, has been an active military flier for over 30 years and has a wide background of command in the U.S. Air Force.

Born in New York City, June 18, 1905, the son of Thomas S. and Mary Rice Power, General Power, following graduation from Barnard Prep, New York, entered the Air Corps Flying School February 17, 1928, and was commissioned a second lieutenant in February 1929.

His early service included assignments at all of the famed Air Corps fields of the day: Chanute, Ill., as a student officer; Langley, Va., as commanding officer of the 2d Wing Headquarters Detachment; Bolling, Washington, D.C., for duty as an Army airmail operations pilot; Randolph, Tex., as a flying instructor; Maxwell, Ala., to attend the Air Technical School; and completing his well-rounded early career as engineering and armament officer at Nichols Field, Philippines.

During World War II, General Power first saw combat flying B–24 missions with the 304th Bomb Wing in north Africa and Italy.

Returning to the United States in August 1944, the general was named commander of the 314th Bomb Wing (Very Heavy) and moved his B–29's to Guam as part of the 21st Bomber Command.

From Guam, General Power led and directed the first large-scale fire bomb raids on Tokyo, Japan, on March 9, 1945.

On August 1, 1945, Gen. Carl Spaatz, then commanding general of the U.S. Strategic Air Forces in the Pacific, moved General Power up on his staff as deputy chief of operations. He served in this capacity during the atomic bomb attacks on Hiroshima and Nagasaki.

During the Crossroads atomic bomb tests at Bikini Atoll in 1946, General Power was assigned as assistant deputy task force commander for air on Admiral Blandy's staff.

Then came assignments as deputy assistant chief of air staff for operations in Washington, and a period of air attaché duty in London, prior to his transfer to the Strategic Air Command as vice commander in 1948.

During the next 6 years, General Power assisted Gen. Curtis E. LeMay, then commander in chief of the Strategic Air Command, in making SAC the world's greatest deterrent force.

Then came his appointment as commander of the Air Research and Development Command in 1954, a position General Power held for 3 years.

When General LeMay was named vice chief of staff of the Air Force, General Power became commander in chief of SAC and was promoted to four-star rank.

General Power has been awarded the Distinguished Service Medal, Silver Star, Legion of Merit with one cluster, Distinguished Flying Cross, Bronze Star Medal, Air Medal with one oak leaf cluster, Commendation Ribbon with one cluster, and the French Croix de Guerre with Palm.

He is a rated command pilot and aircraft observer.

General POWER. Perhaps I can very briefly discuss the primary mission, some of the problem areas that today make it more difficult to carry out that mission, and touch very lightly on some of the philosophies which underlie our actions.

Briefly stated, the mission of SAC is to be prepared to conduct strategic air operations on a global basis so that, in the event of sudden aggression, this command can mount simultaneous nuclear

retaliatory attacks designed to destroy the warmaking capacity of an aggressor to the point that he would no longer have the will nor the capability to wage war.

The important thing is that the Strategic Air Command has that capability today. What is more important is the fact that Mr. Khrushchev and the Soviets are well aware of our capability.

We think this has acted as a very potent deterrent to all-out thermonuclear war. Whether anybody agrees with me or not is really unimportant.

The important thing is that the record is clean and this world has not been engaged in an all-out thermonuclear war, and I would like to comment this is a real good way to keep it, because if we get into one, there will be no winners, only losers in varying degrees.

So there is a tremendous challenge today to stay out of a war, a thermonuclear war on our terms, and I underscore "our terms" because obviously if you give in and quit, why you won't be bombed.

Now this deterrent role is not a static situation. It is a fluid situation. A lot of people think we have built up this nuclear force, and we have a nuclear stalemate, so we can forget about that. Nothing could be further from the truth.

SAC DOES NOT CONSIDER ITSELF THE SOLE DETERRENT FORCE

There are many problems today that are making it more difficult to maintain this deterrent role, and I would like to mention about four general problem areas. Before I do it, I would like to just comment that we in the Strategic Air Command are well aware of our position and responsibilities as an integral member of the overall U.S. military team, and we do not consider oursleves the sole deterrent force. However, we do feel very strongly that we can and must contribute the major share to the deterrent posture of the free world.

Now to go back to some of these problem areas, I will mention about four.

One of them is very apparent—the dramatic advances in military technology with the host of problems that this has brought about.

A second one is the gradual increases in the Soviet's defense capability. Now this is a two-edged sword. It makes our job of penetrating more difficult, but even more important from a deterrent point of view, it tends to raise Mr. Khrushchev's confidence factor that through an adequate defense establishment, he can handle the retaliatory forces.

Now whether he can or not from a deterrent point of view is not the point. If he thinks he can, this is just as dangerous as a real capability.

A third problem area we call the compression of time—a fantastic compression of time, warning time and reaction time, which is not well understood in this country.

The real crux of our fourth problem area is the problem of survivability of SAC's strike capability in the face of a sneak attack by bombers or missiles or both. These are real problems and we are putting a lot of time, talent, and effort to their solution.

But I would like to make this point: That as these problems increase in scope and complexity, our capability has to increase commensur-

ately, if we are to deal with future contingencies as successfully as we have with those in the past.

Stated differently, the mission remains the same. The threat is increasing and our capability has to increase with the threat.

Now what can you do and what are we doing about it? One of the first things you must do is tighten your defenses against sabotage. This is very apparent, because obviously if an aggressor thinks that he can pin down the retaliatory forces just prior to a sneak attack, and thus catch them on the ground and neutralize or destroy them, why this would be very attractive. Historically and traditionally they do not like to trust their plan to a saboteur, but the real experts in the business say the danger is greater today than ever before.

A second thing you can do and we are doing is harden your bases.

Senator STENNIS. What?

HARDENING OF BASES WOULD HELP IN WITHSTANDING A NEAR HIT

General POWER. Harden the bases. This means just what the word says, not that it will enable you to withstand a direct hit by a hydrogen bomb, because there isn't anything that man can build that will withstand a direct hit by the hydrogen bomb. But it enables you to survive a near miss, and it increases his problem.

He has to throw more missiles or more airplanes against you to have a high confidence factor that he can destroy the retaliatory forces. This is vital in missiles and becomes important to a different degree in airplanes. But missiles must be hardened.

Now another connotation of the word "hardening" is backing up your communications so that if one type of communication goes out, you have an alternate system to fall back on.

I would like to comment that we have no capability without communications. Without communications all I command is my desk, and that is not a very lethal weapon. We must have secure and adequate communications.

Let's leave hardening and go to a third thing we are doing, and that is dispersion, dispersal of the force. It is a very good tactic. The obvious advantage is that it increases the target system of a potential aggressor and lowers his confidence factor that he can strike all of the retaliatory force simultaneously. The more it is spread out, the lower his confidence factor.

DISPERSAL INCREASES REACTION CAPABILITY

It has another very important meaning, and that is it keeps you from being runway limited. A homey example of this is if you have all your airplanes on one base and you are told to go to war, the crews are in the cockpits, the engines are turning over and the bombs are in the bomb bay, you can only take off something in the neighborhood of 10 in 10 minutes or 60 in an hour, because you would be runway limited. So by spreading this force out, you dramatically increase your reaction capability.

I have mentioned three things you can do and they are all good. But I would like to comment that they are all defensive in nature, and by themselves they will not deter anyone.

The backbone of SAC's deterrent posture is its alert system. Under this system we maintain a certain percentage of the command on the alert 24 hours a day, 7 days a week, and 365 days a year loaded with bombs and ready to go. We think that this is the only force that a potential aggressor knows that he will have to reckon with, no matter how cleverly he plans a surprise attack. If we have adequate warning, and if this force is big enough, we think he will be strongly deterred.

Touching lightly on some of the philosophies, the philosophy of deterrence. First, it should be very evident that you should know whom you are trying to deter. We are trying to deter Mr. Khrushchev and the Soviets. We are not trying to deter one another.

It doesn't make any difference what anybody in this country thinks of the Strategic Air Command from a deterrent point of view. The only thing that is important is what does Mr. Khrushchev and the Soviets think of the Strategic Air Command.

Another important philosophy is the minimum deterrent. I get asked this question as though this was a nice little package you could go down to the store and buy. Unfortunately there isn't anybody in this world who can tell you what the minimum deterrent is, with the possible exception of Mr. Khrushchev, and I don't think he really knows from one day to another, because he can change his mind. This week he might be willing to absorb more punishment than he will next week, or vice versa.

Another thing in the deterrent role, we must not be misled to think that what will deter us will necessarily deter them. They have been subject to greater disasters than we have in this country. The loss of human life means less to them.

GREAT ADVANTAGES ACCRUING TO AGGRESSOR

I would like to leave the deterrent role for a moment and talk about the philosophy of initiation of a war and the tremendous advantages that accrue to the man who starts a war.

It is difficult to put this in proper focus, but if I take the condition in which we should start a war, I know exactly how much of this force I can generate, how many airplanes I would have, how many bombs would go in those airplanes, what targets they would hit, and about what damage they would do, and this is a tremendous capability under those conditions.

But if you reverse this procedure and pass the initiative to the Soviets, then we can only be in a retaliatory role, and our capability will be greatly reduced. If you gave our previous capability the number 1, under retaliation you only have a fraction of a force. This fraction is that part of your force that is on the alert and can operate within the warning time that is available. This is why there are some people I know who, if I told them we had twice as many bombers and bombs as the Russians, would go to bed tonight feeling secure. They have no business feeling secure, because they just do not understand the problem of passing the initiative to the Soviets.

There is one other thing I would like to mention on warning and reaction time, that there are two different types of warning—strategic warning and tactical warning. Strategic warning is that warning

which is of sufficient duration that a military commander has time to get into fighting configuration and move into fighting position; while tactical warning is of such short duration that a military commander must fight from his present position and his present configuration.

Now, these are some of the elements of this overall job that we have, and I thought I would set the stage that way and then try to answer any questions that you might have.

Senator STENNIS. That is a very fine statement.

Proceed with your questions.

WARNING SYSTEM AGAINST AIRCRAFT SATISFACTORY

Mr. WEISL. Thank you very much, General.

You stated the problems involved in the deterrent efficiency of SAC. Within the limits of security, could you tell us, for instance, on the warning system, whether anything can be done to accelerate the efficiency of that system? We have no warning system today against ballistic missiles, have we?

General POWER. The warning system against aircraft, of course, has been going in and is a good system. It is adequate, I would say. We can live with the warning system that is provided against aircraft.

But, as you stated, against missles, today there is no system in being, and it is of the utmost importance that we get warning against missiles as quickly as we can and be sure that we have that warning.

Mr. WEISL. In your opinion, is that being done?

General POWER. I am not responsible for this program. This is another agency. I know it is underway, and I think it would be better to ask General Partridge—I do not know whether he is going to appear here—or the Department of the Air Force. I have no responsibility for warning. I am a customer for warning. But it is one of the most vital problems affecting our capability.

Mr. WEISL. On the problem of having an alert, you have sufficient manpower to have that kind of an alert?

General POWER. Numbers really are not the whole problem. Our greatest weakness is this tremendous influx of personnel into the command, and the point is that we will never reach our full military posture as long as we have a high percentage of trainees who, about the time the trainee is going to pay off, leaves the service.

The pay bill which the last Congress put through is starting to have a very fine effect—a stabilizing effect. I would like to take this time to comment—there are other things that could be done which would dramatically improve our position. Housing is one—and there is a good program in being; however, I think it should be pushed more vigorously.

There are other things that I think should be done. Serious consideration should be given to increase benefits to those crews that are on the alert, a monetary benefit. Call it inconvenience pay or what you will.

There should be greater career advancement possibilities for those men who are in the hard skills. They are very hard to replace, and they are the very ones that industry wants.

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KEEP GOOD MEN IN, GET RID OF THE WEAK ONES

Sometimes in an overall military structure, in dividing this thing it is difficult to get those men pushed on up. So I think personnel is an area that you can make dramatic advances in your military posture by stabilizing this force, keeping the good men in and getting rid of the poor, the weak ones. You have to do both things.

Mr. WEISL. Have you recommended ways of doing this to your superiors?

General POWER. Yes, there are ways, methods that are under study now, and I am very hopeful they will be vigorously pursued, because they can give us a tremendous uplift.

Mr. WEISL. To your knowledge, is there anything in the present budget that gives you that availability?

General POWER. To the best of my knowledge, these programs that I am talking about, such as alert pay and increased range for some of these people, are not in the present budget.

Mr. WEISL. And increased housing?

General POWER. Housing is in. The Capehart Housing Act is a very fine act.

Mr. WEISL. But does it work?

General POWER. Yes, I would say it is working. Some of the disadvantages, however, are the percentage of houses to be provided is too low, and in addition you come into pressures, local pressures that try to stop the buildup, and these have to be ironed out. It is not going as fast as I would like to see it go.

Mr. WEISL. Are there any other areas that you can tell the committee ought to be accelerated more than they are to make them more efficient?

General POWER. Yes. I think I would like to see the buildup of the force be more rapid. In other words, we have a force structure, but I think it is stretched out too far. I want to see these airplanes and missiles come in faster.

Mr. WEISL. Today you are receiving about the same number per month of B–52's that you were receiving a year and 2 years ago. I think you are receiving less today per month than you were 2 years ago, isn't that right?

General POWER. Well, the numbers fluctuate, but generally speaking the trend is not toward the, I won't say maximum production capabilities, but the production capabilities that are inherent in existing plants.

Mr. WEISL. And the amount of planes overall that are being received by the Strategic Air Command amounts to about what is necessary to replace those that are worn out or destroyed?

General POWER. Well, actually it does not exactly balance out that neatly. We actually received more airplanes last year than we got rid of by retiring the B–36's; but the point is, your main reliance is on the B–47 fleet today. And this fleet is getting old, let's face it, and it will become obsolete. You have to replace it with B–52's, B–58's, or missiles, or all three.

B–47 FLEET NOT BEING REPLACED RAPIDLY ENOUGH

Mr. WEISL. Is that being done rapidly enough, in your opinion?

General POWER. Not in my opinion. I would like to see it done more rapidly.

Mr. WEISL. Are there any other suggestions that you would like to make to this committee?

General POWER. Well, again the point I would like to make, you just cannot consider only airplanes. There are three things that go together—airplanes, personnel, and facilities. You marry the three of them together at the right time and you have a good program. And you must support this program. In other words, some of the areas we are hurting in now are what we call M. & O. money used in the maintenance of your runways, the maintenance of physical plants, and ground-handling equipment that is necessary to support these facilities.

These are areas that we would like emphasis on.

Mr. WEISL. Within the limits of security, can you tell the committee how many planes are in the air on alert constantly?

General POWER. Today on air alert, we do not have any.

Mr. WEISL. Don't you think you ought to have some?

General POWER. I would like to get one going just as soon as we can. We have the capability—have proven the feasibility—of an airborne alert.

Mr. WEISL. Then why don't we have an airborne alert constantly?

General POWER. This is a decision for somebody above me. I am ready to put it up there.

Mr. WEISL. That is about all, Mr. Chairman, that I have. Thank you very much.

Senator STENNIS. May I ask you one question, General. You referred to the personnel and the new pay bill, the new categories that were put in that pay bill for your enlisted men. I am sure you are familiar with that. Is it operating, as far as it goes, satisfactorily, or have you had time to get it into effect fully?

General POWER. Some phases of it are in operation, and they are having a fine effect. All of the provisions have not been implemented yet, particularly with regard to officers.

Senator STENNIS. Is there anything that Congress can do about that part of it? That is an administrative matter, is it not?

General POWER. I believe this is basically an administrative matter, yes, but I do think the Congress could be sympathetic to this overall problem of grades and ratings. Now, this force is getting more and more technical. When you put a man up in an airplane with a hydrogen bomb, he has a tremendous responsibility, and you just cannot use the same figures to compare the ranks that we formerly did, and I think they could be more sympathetic in certain areas in certain fields, particularly the Strategic Air Command, of giving us higher grades and ratings for these highly technical people.

Senator STENNIS. We tried to write in something along that very line in the officer area.

General POWER. Yes.

Senator STENNIS. And did that partly on an experimental basis. I understood that that did present rather complicated problems of

selectivity and related matters, but I think it is something you have to come to.

You really feel that you need more latitude than was given in that bill, is that correct?

SAC ONLY COMMAND AWARDING SPOT PROMOTIONS

General POWER. You see, the Strategic Air Command some years ago started what we call spot promotions. I believe it is fair to say we are the only command which operates on this basis. This is the way I keep the motivation of these crews up, because if they are real pros and can meet our standards, there is an opportunity for them to be spot promoted.

We raise them in rank. I do not have enough spots to meet the requirements, and I am told they are going to have to phase them out in the future.

Now, I think this is bad. I want to keep these spot promotions and I want more of them. I think this is a very important point.

Senator STENNIS. You feel that you need some special category or some special plan which will fit your special problem, is that correct?

General POWER. Yes, sir. I have it. I can administrate it. I have been doing it. All I need is the allocation of these spot promotions. We know just how many we want.

Senator STENNIS. Just what do you mean by spot promotions?

General POWER. Captains, majors, lieutenant colonels, those three grades. Just give me those grades and I will allocate them myself. As long as you are in the war plan and you have a target, a bomb and a target assigned to you and you meet our standards, we will spot promote you. The minute that bomb is taken away from you or for any reason you are no longer in the war plan, you lose your spot promotion.

Senator STENNIS. Do you need legislation to carry out such a program as you mention?

General POWER. I am not qualified to say. I do not think so, but, as I say, I would like to qualify that remark. It might require legislation, because I believe the Air Force is using up these surplus grades they had. I am living really off the fat of the Air Force now, and as they fill up to these ranks, they have to withdraw these spots I have. So it well may be that it does require legislation.

Senator STENNIS. What do you mean when you say "as they fill up these ranks"?

General POWER. You see, the Air Force had so many grades that were not filled in the major and lieutenant colonel. Now, as the force gets older, they are gradually filling these up, and they have to withdraw them from me.

Senator STENNIS All right.

Senator Symington?

Senator SYMINGTON. General, you said something about commanding a desk. You have been in the strategic air business a long time, have you not?

General POWER. Yes, sir. I started in the bomber business in February 1929, and I have been in it about 31 years with a few short assignments out of it.

Senator SYMINGTON. How many combat missions did you actually fly yourself in World War II?

General POWER. Oh, I don't know. Somewhere between 10 and 20.

Senator SYMINGTON. And what was your position at the end of the war?

General POWER. I was in command of a B–29 wing on Guam, the 314th Wing.

Senator SYMINGTON. As I follow your testimony here and the testimony of other witnesses, we hope to have an adequate missile position and we hope to have an adequate submarine position. But as of today, our great deterrent, in your opinion, against an all-out attack, is the Strategic Air Force that you command; is that correct?

General POWER. There is no doubt in my mind about the accuracy of that statement.

Senator SYMINGTON. Since I have been around the Senate, I have not heard a more articulate presentation than that which you just gave this committee today.

You mentioned that there are two very important characteristics of your command that must be right. One is alert capacity, and the other is dispersal; is that correct?

General POWER. Yes, sir; and hardening.

Senator SYMINGTON. And hardening. Would you want to discuss your position on those in an open session, or would you prefer to do that in a closed session?

General POWER. The number of airplanes actually on alert is a very sensitive bit of information.

DISPERSAL ON SCHEDULE BUT COULD BE IMPROVED

Senator SYMINGTON. Then let us not discuss it at this time.

And how about the question of dispersal?

General POWER. The dispersion program is relatively on schedule. If you asked me, "Could you improve this program, could you go faster, enlarge it?" I would say yes, you could, and it would be desirable to do so.

Senator SYMINGTON. And then how about hardening?

General POWER. Hardening is basically in the missile field, and, as you know, there is tremendous emphasis that way, and as far as I know, we are going into hardening as rapidly as you can logically go into it.

Senator SYMINGTON. From the standpoint of what we believe a possible enemy would do, the first attack that he would make on us would be to destroy our capacity to retaliate, would it not?

General POWER. That is correct. You cannot start a war today unless you have a capability to knock out the opposing strike force, and I would like to mention when I talked about initiative before and this deterrent role, that people should understand that you never must get in the position that you cannot start a war yourself. You always must have a capability to strike first, because obviously if these people thought we never could start a war, why, then they could just take this world away from us, piece by piece, because they would know that as long as they do not strike us, we could never do anything about it. So you must have a capability to strike first.

Senator SYMINGTON. Therefore, the most important thing for us to do would be to defend our bases from where we plan to retaliate; would it not?

General POWER. The bases must be defended through the hardening and through the dispersal concept, but the real way to defend this force is to have it off the ground before they strike.

Senator SYMINGTON. Do you know why we put our Nike installations all around the cities, then, instead of around our bases?

General POWER. I have no responsibility for that, and it is not in my field.

Senator SYMINGTON. What do you think about these air-to-ground missiles, the importance of them?

General POWER. For ourselves?

Senator SYMINGTON. Yes; like the Hound Dog.

General POWER. The Hound Dog is a tremendous weapons system right now. As the defenses increase—and let's face it, they are improving—you must fight the defenses. In the last war we did not fight them because they were not worth fighting. We only had a loss rate of 1.7 percent of all bombers due to enemy action in the last war. Why fight them? But they have improved, and we are going to fight our way in. We are going to fight our way in with hydrogen bombs.

Senator SYMINGTON. Last year the Congress appropriated a good many million extra dollars for the Hound Dog, and not one cent of the additional money was utilized. To the best of our information, none of it is scheduled to be used during the present fiscal year.

B–52–G, HOUND DOG CARRIER, JUST STARTING TO ROLL

General POWER. The Hound Dog, to the best of my knowledge, is going as fast as you can push it. Now, you could produce more missiles, but it is not quite that simple, because you have to have an airplane to hang them on. The airplane that is going to receive this missile as it comes down the production line is the B–52–G, which is just starting to come out, and they will come out with it.

But if you produce these missiles and I have to give up E's and F's, take them out of my inventory and put them in modification so they can receive these missiles, that takes them out of the active inventory. So there is a rate in which you can do this thing without weakening your position.

Senator SYMINGTON. That is a good answer and I am very glad to hear it.

You are satisfied with the development of the Hound Dog?

General POWER. I am satisfied with the Hound Dog program.

Senator SYMINGTON. As I understand it, you mentioned the B–47's and obsolescence. You have B–47's and B–52's, and some B–58's starting to come in; is that correct?

General POWER. Those are the three aircraft that are either in or coming in the immediate future. The B–58, we do not have any in SAC today.

Senator SYMINGTON. But it is planned for that to come into SAC; is it not?

General POWER. Yes; we are testing them now.

Senator SYMINGTON. Those three aircraft are the striking core of SAC.

General POWER. In the manned field; yes. In addition, the B–70 is under development.

Senator SYMINGTON. How about the tanker, KC–135?

General POWER. The tankers are vital to the program, because your real solid position is being able to operate from this country, and it gives you flexibility so you do not have to go in in a straight line. We have to have tankers.

Senator SYMINGTON. And what would you say was the No. 1 priority of SAC?

General POWER. The No. 1 priority of SAC is the B–52—KC–135 package with the Hound Dog. That is the No. 1 priority.

Senator SYMINGTON. That is the B–52–G?

General POWER. The B–52–G or H, the new model, with the KC–135 and the Hound Dog, is the No. 1 priority. This will buy you more deterrent posture in the immediate future than anything else.

Senator SYMINGTON. We create problems for ourselves. We do not do this because of that, and then we do not do that because of this. At one time we are told that we can go slow on the ICBM because of SAC bombers; another time we are told that we can go slow on SAC bombers because of the development of the long-range missiles.

KC–135 TANKER APPROPRIATIONS NOT BEING UTILIZED

Last year, the Congress appropriated $135 million for what you say tonight is your No. 1 priority, and yet not a single cent of that money was utilized in the purchase of these tankers.

Do you have any knowledge of why that was not done?

General POWER. No; I have no control over that at all.

Senator SYMINGTON. Has anybody explained it to you?

General POWER. No. They just explained it in their overall programs. I can make recommendations on what I need, but I have no control over how the money is spent.

Senator SYMINGTON. General Power, I am glad to see you looking so well, because, in my opinion, you and your command are mighty important to the future security of the free world.

Thank you, Mr. Chairman.

Senator STENNIS. Mr. Case of New Jersey?

Senator CASE of New Jersey. No questions.

Senator STENNIS. Mr. Case from South Dakota?

Senator CASE of South Dakota. Mr. Chairman.

General Power, the first item you mentioned under the maintenance of survivability capability was sabotage. I have thought, as I visited some SAC bases in recent months, that the security regulations were not as stringent as they were a few years ago.

Have you lightened up on your security regulations?

General POWER. No, but let me explain that. We ran a lot of tests, and we found out that it is virtually impossible to protect a whole base against trained saboteurs, because I used trained men to do this. There is a very obvious reason. You have highways lining your bases. They are up against you before you can do too much about it.

Now, there are areas that you can defend. We were making an attempt before to protect the whole base, and maybe it looked good.

Maybe it looked good to you as a casual visitor. But when I tested it, I did not like what I saw.

Now I have narrowed this thing down to the key, vital points, such as the alert force. I am going to protect that alert force, and I wouldn't recommend to anybody that they go wandering around there unless they belong to that alert force or unless they understand one word in the English language, and that is the word "Halt."

Senator CASE of South Dakota. I think that is a good point.

General POWER. The point is, you can knock yourself out in soft area, and all you do probably is slow yourself down and use thousands of men. The thing to do is concentrate in the hard areas—the aircraft, the communications, the control—and that is what we are doing.

Senator CASE of South Dakota. The second item which you mentioned was the hardening of bases, and you applied that particularly to the missile field. You said that missiles must be in the hard configuration.

General POWER. Yes, for the obvious reason that they have to ride the attack out. You just cannot call a missile back. They are going to have to survive the attack; while the aircraft, the alert force, you can get off the ground.

ATLAS AND TITAN PROGRAMS INCLUDE BASE HARDENING

Senator CASE of South Dakota. Does that have any bearing upon the relative emphasis that should be placed upon either the Atlas or the Titan program?

General POWER. No. They both have capabilities of hardening, and they both have hardening in their programs.

Senator CASE of South Dakota. I was under the impression that one of them is a little more susceptible to a true hard configuration than the other.

General POWER. Well, I think you could ask Schriever and get his opinion on this thing. But as you started out, one did look better, but as you went down the Atlas path, this now it is entirely feasible to harden.

Senator CASE of South Dakota. The fourth thing you mentioned was the dispersal or dispersion of the force. Do you regard SAC as having adequate bases for dispersal today?

General POWER. No. The ideal would be to have one cocked, loaded airplane on a field. That would be the ideal.

Senator CASE of South Dakota. Do you have enough alternate landing fields?

General POWER. Well, of course this would involve the use of civilian fields. I think it is technically feasible to do this, to spread this force out a lot more than it has been spread out. But I want to caution that you cannot do it with this personnel problem we have. You have to stabilize this personnel force in order to spread it out, because you cannot carry on training in all these little cells.

Senator CASE of South Dakota. Do you have a program for bringing in the commercial fields in case——

General POWER. We have studied it in SAC. We are in the process of studying it now. This is something that could be done. It could be done.

Senator CASE of South Dakota. The chairman asked a question with regard to the personnel, and I hope you will give that a little further thought, and if you find that you are lacking in legislative authority to make these spot promotions which you feel would be helpful in providing the necessary incentives, the committee would be glad to have a specific recommendation on that point.

BUYING PRIVILEGES WOULD PROVIDE INCENTIVES

General POWER. It is tremendously important, and I would like to add two other things which will increase this motivation and stabilize this force. The word is "privilege." It is probably a poor word, but it is things we used to have in the services and we have lost now.

For example, you used to be able to buy gasoline, when I first came into the service, for 5 cents a gallon. Well, I did not get rich on what I saved, but I mean I got a lot of mileage out of the fact that I was getting that gasoline very cheap.

We used to buy things wholesale in the post exchanges. We used to be able to buy food very cheap in the commissaries. Now you have surcharges, and you have things which tend to raise these prices so that they are not competitive with local markets.

The point is, you have lost those privileges you had; and this would involve, from the taxpayer's point of view, no money, you might say. Certainly it would hurt certain merchants in certain areas, but you would get an awful lot of mileage out of this thing as far as stabilizing this force and increasing their motivation to stay in, particularly in the commissary area, that of food.

We put this surcharge on food items that goes back to the Treasury, and I would like to see it removed.

Senator CASE of South Dakota. Mr. Chairman, it is always an inspiration to hear testimony by General Power, either in Washington or out of it, and I am sure he has made a contribution to the work of the committee today.

Senator STENNIS. Thank you, Senator Case.

May I ask you one question, General. You referred there to your power to knock out and take out of operation the enemy's power to make war on you or to attack you. Turning that around, we get a good many letters asking us, "Does Russia have the power to knock out our striking power, our retaliatory power?" In other words, knock out your command.

General POWER. This is this fine point that I was making before; that is not too well understood. It depends on how much warning you have. Now, if you can guarantee me a certain amount of warning so I could get my ground alert off—it is designed for 15 minutes. If you give me 15 minutes of warning, you will not knock out SAC's alert force.

But if I have no warning and if I have no capability to operate under conditions of no warning, then it is conceivable you could knock out SAC, and this is why it is so important to know how much warning you have, be sure of it, and then tailor your force to operate within it. Because we can tailor a force to operate with zero warning, 5 minutes, 10 minutes, 15 minutes, whatever we are sure we have.

Senator STENNIS. It is certainly well for you to emphasize it. Of course, to knock out your full capability there would have to be a strike almost simultaneously in many areas all around the world.

General POWER. Yes.

Senator STENNIS. Is that not correct? And that makes it remote that anytime soon they can take you out of this picture; is that correct?

General POWER. It is difficult with the airplane situation to conceive them doing it; but with the missiles, this is going to change. I think we are going into a very critical area when the Russians get operational missiles in quantity; these problems are going to get very severe, and this warning problem will then become vital, or your ability to operate with zero warning.

WE ARE RELATIVELY SECURE AS OF NOW

Senator STENNIS. I heartily agree on the missile, but as of now, you are in a position to survive with a large percentage of your operation?

General POWER. Tonight I think you can go to bed feeling relatively secure, but I think the future will depend on what we do about it.

Senator STENNIS. Senator Symington?

Senator SYMINGTON. As I understand it, what you believe we need for the security of the country is, No. 1, to have the strength to get up if we are knocked down in a sudden sneak attack and, in turn, destroy the enemy as a result of their attacking us. No. 2, to be sure that not only we know that and our allies know it, but that the enemy knows that we have that strength.

General POWER. It is vital that Mr. Khrushchev know about our capability; yes.

Senator SYMINGTON. And No. 3, to be able to handle ourselves in any limited or so-called peripheral war.

General POWER. Yes.

Senator SYMINGTON. If we have those three things, then our country is secure; is that correct?

General POWER. You worded the first one a little different than I would word it.

Senator SYMINGTON. Will you reword it, because you are far more of an expert on it than I am.

General POWER. You must be sure that SAC's strike capability can survive a sneak attack by bombers or missiles, or both. In other words, the strike force must have survivability in it.

Senator SYMINGTON. You would say bombers or missiles or submarines; would you not?

General POWER. Anything that attacks. Now, this gets back to warning and the configuration of your force that can operate within that warning. If it is zero warning, you must have a force which can operate under zero warning and not be destroyed.

Senator SYMINGTON. So what you are really saying is that it is vitally important to the security of the United States to have on hand and combat ready modern missiles and modern planes and adequately trained people to handle them, because we will never originate any possible nuclear war; is that correct?

General POWER. I would say there is little likelihood of it. However, you can never be put in the position that you do not have the capability

to strike first, because, then, they obviously just take you over bit by bit.

Senator SYMINGTON. Thank you, Mr. Chairman.

Senator STENNIS. Does counsel have any further questions?

Mr. WEISEL. No, Mr. Chairman.

Senator STENNIS. Senator Cannon, do you have something?

Senator CANNON. No questions.

Senator STENNIS. Senator Hruska, we are glad to have you here. Do you have questions you wish to ask?

Senator HRUSKA. No, thank you, Mr. Chairman.

Senator STENNIS. We thank you very much. You have told us a great deal in a fairly few minutes. I think you have been quite helpful to us and to the public.

I will read, for those who are interested, a very brief statement here with reference to the witnesses tomorrow, giving their names.

Tomorrow the committee will reconvene at 10:30 a.m. instead of 10 a.m. as previously announced. The hearings will be open as they are today, and our first witnesses in the morning will be Dr. T. Keith Glennan, Administrator, National Aeronautics and Space Administration; Dr. W. H. Pickering, Director of the Jet Propulsion Lab of the same Administration; Dr. Homer J. Stewart, Director of Planning and Evaluation of the same Administration.

In the afternoon we will have Dr. Herbert York, Director of Defense Research and Engineering; Mr. William M. Holaday, Director of Guided Missiles; Mr. Roy Johnson, Director of Advanced Research Projects Agency; and Dr. Wernher von Braun, Director, Development Operations Division, Army Ballistic Missiles Agency.

We wish to thank everyone for their patience.

(Whereupon, at 6 p.m., the subcommittee recessed, to reconvene at 10:30 a.m., Friday, January 30, 1959.)

If there is nothing further, the committee will recess until tomorrow morning at 10:30.

MISSILE AND SPACE ACTIVITIES

FRIDAY, JANUARY 30, 1959

U.S. SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE OF
THE COMMITTEE ON ARMED SERVICES, AND THE
COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES,
Washington, D.C.

The subcommittee (composed of Senators Johnson of Texas, chairman, Stennis, Symington, Bartlett, Bridges, Saltonstall, and Mrs. Smith) met, pursuant to recess, at 10 a.m., in the caucus room, room 318, Senate Office Building, Senator John Stennis presiding.

Present: Senators Stennis, Symington, Bartlett, and Smith.

Also present and participating:

Members of the Committee on Aeronautical and Space Sciences: Senators Anderson, Young of Ohio, Cannon, Wiley, Martin, and Case of New Jersey.

Also present: Senator Case of South Dakota and Senator Engle.

Staff members, Preparedness Investigating Subcommittee: Edwin L. Weisl, special counsel; Cyrus R. Vance, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, associate counsel; Stuart French, associate counsel; and Dr. Edward C. Welsh, assistant to Senator Symington.

Staff members, Committee on Aeronautical and Space Sciences: Kenneth E. BeLieu, staff director; Max Lehrer, assistant staff director; Everard H. Smith, Jr., counsel; Dr. Glen P. Wilson, chief clerk, and Mrs. Eilene Galloway, special consultant.

Senator STENNIS. The committee will please come to order. First a word from Senator Johnson, the chairman of the committee, who is unavoidably detained on a matter of most urgent and important nature.

Certainly nothing could be secondary to this hearing unless it was an emergency of overwhelming importance, and that is what he has to attend to this morning, but will be here as soon as he possibly can.

I have a brief opening statement of Senator Johnson's that I will read:

This morning's session of the Preparedness Investigating Subcommittee and the members of the Committee on Aeronautical and Space Sciences meet to continue the hearings started yesterday on the subject of what has happened to the Nation's preparedness program.

Over a year ago—on the 4th of October 1957, to be precise—the Russians launched the first sputnik. Almost a month later, Sputnik No. 2 went into orbit.

Since then we have placed five satellites in orbit, including the Atlas missile, and attempted two lunar probes.

Russia has placed an additional satellite in orbit and launched what appeared to be a highly successful lunar probe.

All Russian successes indicate boosters of greater power than we possess and give evidence of their technical achievements.

Since that time both Houses of Congress have established committees with jurisdiction over space programs. Legislation has been passed establishing the National Aeronautics and Space Administration.

This committee wants to know where we now stand. When can the American people expect to catch up with the Russians?

We will want to know the division of authority and the methods of coordination between the Department of Defense and NASA and the substance and adequacy of our programs.

Our witnesses this morning are Dr. Glennan, Administrator of the National Aeronautics and Space Administration; Dr. Pickering, Director of the Jet Propulson Lab of NASA, and Dr. Stewart, Director of NASA's Planning and Evaluation.

Gentlemen, in keeping with the policy of the committee, all witnesses will be sworn. All three of you please stand. Do each of you solemnly swear that your testimony here before this committee will be the truth, the whole truth, and nothing but the truth, so help you God?

Dr. GLENNAN. I do.

Dr. PICKERING. I do.

Dr. STEWART. I do.

Senator STENNIS. Have a seat, please.

May the acting chairman observe that the gentlemen who handle the lights think that they have relieved us somewhat of the strong and incessant glare that we had nearly all day yesterday.

These photographers have agreed that their activities are going to be on opposite sides from the questioner.

I think they have a place in getting the news out to the public, but I do hope they will act with the greatest physical restraint.

Gentlemen, we are indeed glad to have you here this morning. I, along with others, think that these hearings have a very important part not only with the Congress but with the American public.

We appreciate your willingness to come here and within proper limits give us the benefit of your problems as well as your plans.

I am going to ask now that Mr. Vance, our associate counsel, proceed with the original questioning. Do you have prepared statements?

Dr. GLENNAN. I do, sir.

Senator STENNIS. Very well, Doctor. We will be very glad to hear you now, and your prepared statement.

(The biography of Dr. T. Keith Glennan is as follows:)

T. KEITH GLENNAN, ADMINISTRATOR, NASA

T. (Thomas) Keith Glennan took the oath of office as Administrator of the National Aeronautics and Space Administration on August 18, 1958, after his appointment by President Dwight D. Eisenhower. He became the first Administrator of the new Government organization after its creation under the National Aeronautics and Space Act of 1958.

As Administrator, Dr. Glennan heads a staff of scientists, engineers, and technicians, and other employees engaged in research and development in aeronautics and space matters.

The NASA is an independent agency reporting directly to the President. In his capacity as the principal administrative officer of the NASA, Glennan is a member of the National Aeronautics and Space Council.

Glennan is president-on-leave of the Case Institute of Technology, Cleveland, Ohio, which he has headed since 1947.

He was born in Enderlin, N. Dak., on September 8, 1905. Dr. Glennan spent most of his youth in Eau Claire, Wis., where he attended high school, worked at a variety of odd summer jobs, and spent 2 years at State teachers college.

In 1927, after working his way through college, Glennan was graduated with honors from the Sheffield Scientific School of Yale University with a degree in electrical engineering.

Following graduation, Glennan became associated with the newly developed sound motion picture industry, and spent 2 years in Europe supervising the installation of sound systems, for the Western Electric Co. He later became assistant general service superintendent for Electrical Research Products Co., a subsidiary of Western Electric.

In 1935, he joined Paramount Pictures, Inc., in Hollywood, becoming studio manager in 1939. In 1941 Glennan was associated briefly with Vega Airplane Corp., returning to the motion picture industry as studio manager of Samuel Goldwyn Studios.

The NASA Administrator joined the Columbia University Division of War Research in 1942, serving through the war, first as Administrator and then as Director of the U.S. Navy's Underwater Sound Laboratories at New London, Conn.

For his contributions to research during World War II, he was awarded the Medal of Merit.

At the end of the war, Glennan became an executive of Ansco, Binghamton, N.Y. From this position he was called to the presidency of Case. From October 1950, to November 1952, concurrent with his Case presidency Glennan served as a member of the Atomic Energy Commission.

While Glennan was president of Case, important progress was made in increasing both the quality and quantity of the faculty, student body, and physical plant.

A major building program was initiated through which the floor space of the campus was more than doubled. Important curricular changes emphasizing the role of the humanities in engineering education were initiated.

During his 11-year administration, Case was transformed from a primarily local institution into one that ranks wth the top engineering schools in the Nation.

Glennan has been extremely active in national and local affairs. He was chairman of the board of the Institute for Defense Analysis, on the board of the National Science Foundation, and on the Council on Financial Aid to Education. He was a member of the General Advisory Committee of the Atomic Energy Commission. As chairman of the Metropolitan Services Commission of Cleveland, Glennan was concerned with improving government services in the greater Cleveland area, and in the development of a $175 million cultural and educational center in that city.

He was a trustee of the Cleveland Clinic Foundation. He was a member of the boards of the Cleveland Electric Illuminating Co., the Clevite Corp., Standard Oil (Ohio), and the Harris-Intertype Corp.

Glennan continues as a trustee of Case but has taken a leave-of-absence from the presidency of the institute to become NASA Administrator.

When he assumed his duties with NASA, he resigned from all of his other educational and business obligations.

Glennan is a fellow of the American Academy of Arts and Sciences, and member of Sigma Xi, Tau Beta Phi, and Chi Phi. He has been awarded honorary degrees of doctor of science from Oberlin College, Clarkson College of Technology, and John Carroll University, and a doctor of engineering degree from Stevens Institute of Technology and Fenn College.

He is married to the former Ruth Haslup Adams, daughter of the late Dr. Thomas Sewell Adams, eminent Yale professor and tax authority, whom Glennan served as a chauffeur while attending college. He has four children: the eldest, Thomas Keith, Jr., is attending graduate school at the Massachusetts Institute of Technology; Catherine, a recent graduate of Swarthmore and now a graduate student in library science at Western Reserve University; Pauline who is about to graduate from high school, and Sarah from junior high school.

(The biography of Dr. William H. Pickering is as follows:)

WILLIAM H. PICKERING, DIRECTOR, NASA-CAL TECH JET PROPULSION LABORATORY

William H. (Hayward) Pickering is Director of the Jet Propulsion Laboratory, Pasadena, Calif., which is operated by the California Institute of Technology under contract to the National Aeronautics and Space Administration.

Dr. Pickering directs the research and development work of about 2,300 scientists, engineers, and supporting staff, in the fields of rocket propellants, and in electronics, communications, and guidance used in space technology.

Dr. Pickering is a native of Wellington, New Zealand. He earned a bachelor of science degree in 1932, a master of science degree in 1933, and a doctorate in physics in 1936 at California Institute of Technology.

He has been a member of the faculty of Cal Tech since 1932 and was appointed professor of electrical engineering in 1946. He has been associated with the Jet Propulsion Laboratory since 1944.

He later was in charge of electronics work and in 1950 was given the responsibility for the Corporal missile program at JPL. In 1954, he was named Director of the Laboratory.

Dr. Pickering's fields of research have included cosmic rays, telemetering from balloons and rockets, microwave propagation, development of cosmic ray radiosonde, and missile guidance problems.

His memberships have included the Scientific Advisory Board of the U.S. Air Force, a number of other committees of the Department of Defense, and the U.S. National Committee's Technical Panel on the Earth Satellite Program and its Working Group on Tracking and Computation.

He is a fellow of the Institute of Radio Engineers, the American Rocket Society, and a member of the American Institute of Electrical Engineers.

His awards include the 1957 James Wyld Memorial of the American Rocket Society; a special award by the Los Angeles Chamber of Commerce in 1958 for creative achievements; and a scientific achievement award from the Greater Los Angeles Chapter of the Association of the U.S. Army in 1958.

Dr. Pickering is married to the former Muriel Bowler. Dr. and Mrs. Pickering and their children, William B., 19, and Anne E., 16, live at 2514 Highland Avenue, Altadena, Calif.

(The biography of Dr. Homer Joseph Stewart is as follows:)

HOMER JOSEPH STEWART, NASA'S DIRECTOR OF PROGRAM PLANNING AND EVALUATION

Homer Joseph Stewart joined the National Aeronautics and Space Administration as Director of the Office of Program Planning and Evaluation, on October 15, 1958. Previous to his appointment, he was professor of aeroneutics at the California Institute of Technology and chief of the liquid propulsion systems division of the Jet Propulsion Laboratory of Cal Tech.

Dr. Stewart, who reports directly to the NASA Administrator, is responsible for the planning of national programs in space technology and exploration both for the immediate and the long-range future.

He is also concerned with the evaluation of progress in aeronautics and space programs now underway.

Dr. Stewart is a native of Michigan. He received his bachelor of science degree in aeronautical engineering from the University of Minnesota in 1936, and then did postgraduate work in the fields of aeronautics and meteorology at Cal Tech, where he earned his doctorate in aeronautics in 1940.

Serving on the faculty of Cal Tech continuously from 1936 until his appointment to the NASA staff, he reached the status of professor of aeronautics.

In 1939, he became actively interested in the early pioneering rocket research of a few Cal Tech engineers and scientists in a foothill area of the San Gabriel Mountains north of Pasadena. This small group formed the nucleus of what later became the Jet Propulsion Laboratory.

JPL is operated by the California Institute of Technology under contract to the NASA.

Before joining the NASA, Dr. Stewart divided his time between the faculty of Cal Tech, the Jet Propulsion Laboratory, and various consulting commitments.

For some years as Chief of the Research Analysis Section, he participated in many pioneering rocket projects, such as the WAC Corporal, the Corporal, the Bumper, the Sergeant, and the Jupiter C. He was a Division Chief in the early Design and Power Plants Department, and participated in the joint effort of the Jet Propulsion Laboratory and the Army Ballistic Missile Agency in developing and launching the first American satellite, Explorer I. He has been a consultant to the Aerojet General Corp. of Azusa and Sacramento, Calif., and to various agencies of the Department of Defense.

He is past-Chairman of the Advisory Group on Special Capabilities, and recently served as consultant to the Senate Preparedness Investigating Subcommittee.

NASA's Director of Program Planning and Evaluation is a member of Sigma Xi, the American Association for the Advancement of Science, the Institute of the Aeronautical Sciences, the American Rocket Society, and the American Meteorological Society.

Dr. Stewart is married to the former Frieda Klassen. Dr. and Mrs. Stewart and their three children, Robert, 13, Katherine, 11, and Barbara, 8, live in Sumner, Md. Their permanent residence is Altadena, Calif.

TESTIMONY OF DR. T. KEITH GLENNAN, ADMINISTRATOR, NASA; DR. W. H. PICKERING, DIRECTOR, JET PROPULSION LAB, NASA; AND DR. HOMER J. STEWART, DIRECTOR, PLANNING AND EVALUATION, NASA

Dr. GLENNAN. I have a statement, Mr. Chairman, which I will be glad to read or place in the record, as is your pleasure.

Senator STENNIS. It is not classified, I understand.

Dr. GLENNAN. It is not classified, sir.

Senator STENNIS. I think you have somewhat of a choice there as to whether or not you put it in the record and address yourself to it or whether you read it.

Personally, I think that we get more out of it if you put it in the record and then address yourself to it.

Dr. GLENNAN. I am perfectly happy to do that, sir.

Senator STENNIS. Very well, pass it over to the reporter, please.

(The statement of Mr. Glennan is as follows:)

Mr. Chairman, members of the committees, and counsel:

QUOTES FROM STATEMENT BY SENATOR JOHNSON

Senator Johnson, the other night, as I was doing some homework in preparation for this appearance you have permitted me, I reread your remarks made to the Senate on January 23 of last year, at the conclusion of the Senate Preparedness Subcommittee hearings on satellite and missile programs.

Permit me to recall that, after months of hearings and speaking unanimously for the subcommittee, you said in part:

> Our country is entering a new period of history in which the total resources of America must be brought to their greatest development.
>
> No segment of our economy or of our life must be ignored or neglected. Our programs, our policies and our practices must all be in good working order. A full national effort is required and this can be achieved only by people working together. The goal is not merely to imitate some Soviet missile or some Soviet achievement. This attitude could lead us into a hypnotic trance in which we would forget that our true strength is our freedom. That is a fundamental which we must not forget. We would lose much more than we would gain if we tried to match totalitarian accomplishments by adopting totalitarian methods and values. Our need to mobilize today flows from the need of catching up with the Soviets.

This statement was made 8 days before the first successful satellite launching of the United States. Now, a full year later, we in the United States are on our way—on a great adventure—to explore the distant unknowns of space. The start we have made—and it can be

considered as no more than a first step—has been marked both by successes and by failures.

Our successes were important. They provided information of great value about the sea of space through which our earth is hurtling at 66,000 miles an hour. Our failures were important also. They reemphasized how difficult the paths into space are going to be.

Halfway around the world, the Soviets also were making their first ventures beyond the atmosphere of the earth. They were, in fact, showing the way, first with their sputniks and then with their lunik. These, certainly, were spectacular successes, and the Russians made powerful use of them for many purposes.

IMPACT OF RUSSIAN PROPAGANDA CALLED ENORMOUS

The Russians have taken their space effort and forged it into a sharp effective weapon for use in their unceasing struggle to capture the minds of men around the world. Recently on his return from a visit to Russia, Dr. Gerard P. Kuiper, the world-respected director of the Yerkes Observatory of the University of Chicago, made a statement about this very matter. He said:

> The skies and the heavens above have been considered traditionally as the work of God, thus penetrating the heavens and putting a star between the stars is almost a godlike act. The Russians have understood this very well and have announced that they have placed among the stars the first new object since the God of the Old Testament. Now, we may not like such terms, but that is the way the Russians present them. The impact of Russian propaganda has been enormous, in Russia and the rest of the world.

Last summer, I personally traveled several thousands miles through the Soviet Union as one of 10 university presidents studying the Russian system of higher education. It was a sobering experience.

I wish to quote a single sentence from that report which we prepared on our return:

> It is of primary importance to recognize that education in the Soviet Union is not a basic resource which undergirds the society, but a tool fashioned, sharpened, and changed by the state in its own interests as those interests may be determined by the [Communist] party.

The same thing must be said about Russian space efforts. They are used not so much to enrich man's understanding of his world and the universe as they are to serve the special political interests of the Soviet state.

Recognition of this Russian purpose in space effort can only increase our awareness of the validity of the statement by your Preparedness Subcommittee which I mentioned earlier.

Now I want to speak about space matters with which I have been personally concerned in the months since I was confirmed on August 15 as NASA Administrator.

I have said repeatedly that our space mission is so vital that we must carry it forward with the same sense of urgency we had during the war. In fact, I have made this comment so many times that some people might think that this phrase is becoming a cliche. But I know of no better way to say something that all Americans must believe and practice if we are to make maximum progress in this field.

The Space Act provided expressly that NASA should become operative 90 days after its enactment, July 29, or on any earlier date that the Administrator might determine. We shortened this 90-day period of preparation by one-third, and as of the close of business, September 30, NASA was in operation.

In getting NASA underway, we have had to organize with one hand, while, at the same time, we were trying to operate with the other. This, we all know, is not the most efficient way to do business. We should have planned first, and organized, and only then begun to operate. This is the way we would have tackled the job, except for the inescapable fact—there was not time. There was not then, and there is not now, time for us to proceed in the most orderly fashion.

NASA IN PROCESS OF ORGANIZATION

We have accepted the realities of the situation. We have improvised task-force teams that by brute effort could get done as quickly as possible what had to be done. We recognize that for the long pull, to get the best results most quickly and most surely, we must accomplish proper organization of our people to insure that they function smoothly as an efficient team. This we are doing.

It was not necessary for NASA to begin from a standing start its programs in space technology, space science, and space exploration. The Space Act provided for transfer to NASA of, and I quote:

> all functions, powers, duties, and obligations, and all real and personal property, personnel (other than members of the Committee), funds, and records of the NACA.

The important item in the transfer was not the $350 million value of the finest of research facilities nor even the comprehensive flight research programs of the NACA that ranged all the way from problems affecting VTOL aircraft to those peculiar to satellites and space probes.

The really important element in that transfer—the one which enabled NASA to move rapidly into action—was the group of nearly 8,000 scientists, engineers, and supporting personnel that we inherited from NACA. Last August at the confirmation hearing when I was asked what I thought my job called for, I said, "It isn't just a matter of the money that is involved, but it is a matter of the people involved and how one best can motivate the people to highest performance."

I have had no problem providing the motivation to obtain highest performance from these people. They believe very earnestly in what we are trying to do. They feel the urgency with which we must do our work. They are experienced and talented people who are contributing effectively to the national space effort.

TRIBUTE TO DR. DRYDEN

On this point, I should like to add a very personal word. The President nominated, and the Senate confirmed, Dr. Hugh L. Dryden to be Deputy Administrator of NASA. Hugh Dryden who had directed the work of NACA for 11 years, has been a great tower of strength during this formative period of the Space Administration. Without his unflagging help and his wise counsel my job would have been well-nigh impossible.

The NACA transfer provided us with first rate research activities on a broad front in both aeronautics and space. The record shows there isn't an airplane flying today that doesn't reflect in many important ways the good results of NACA research. The same can be said for our missiles. Six years ago this month, NACA began studies which led to construction of the X–15, America's first vehicle designed to carry man into the upper limits of the atmosphere where space begins. NACA's researches were being accelerated even then on the problems which require solution to enable us to venture confidently, safely, and surely into space. Today approximately 60 percent of the research effort at these centers bears directly on problems, the solutions of which are fundamental to progress in space.

There were, however, other research, development, and operational areas in which NASA had to become deeply involved to accomplish its total mission. These included electronics, guidance, rocket systems, and so forth. There were possible two obvious solutions. One was to start from scratch, selecting sites, constructing, and equipping new facilities, and then undertaking the painful process of staffing the new laboratories. Such a solution would have been very expensive. It would have required the raiding of staff from other organizations. Most serious, of all considerations, it would have delayed our progress very materially. The other solution, and the sound one I believe, was to acquire facilities already doing outstanding work in the required areas. This is the course we have been following.

On December 1, the President proclaimed the transfer to NASA from Army jurisdiction of the Jet Propulsion Laboratory at Pasadena, operated under contract by the California Institute of Technology. By this action, NASA acquired a high order of capability in electronics, guidance, propulsion, systems analysis, and in tracking and telemetry. This organization of 2,300 people is experienced in missile systems and space vehicles as proven by its accomplishments with the Corporal and Sergeant missiles and the upper staging and payload of the Explorer satellite and Pioneer III space probe.

At the same time these negotiations were underway for acquisition of the Jet Propulsion Laboratory, we requested that the Army transfer to us a portion of the Army Ballistic Missile Agency at Huntsville, Ala.

Such a transfer would have given us a highly imaginative and competent engineering and design group capable of serving as an integral part of our team in the planning and executing of both short- and long-range programs in the development of boosters and vehicular systems. Such a group would have served also to monitor contracts with other governmental agencies and with industry, to provide a necessary ground testing and assembly capability, and to supervise all launching operations for NASA.

NASA DISAPPOINTED AT REFUSAL TO TRANSFER ABMA

To our disappointment, the Department of Defense determined that the Army Ballistic Missile Agency's special talents were necessary to the accomplishment of certain missile projects vital to the Nation's defense posture. We did not wish, of course, to interfere in any way with our defense effort, and in fact, had included this provision in our original request. Although the Department of Defense was un-

able to agree to transfer of the portion of ABMA we wanted, arrangements were made for the Army to be "completely responsive" to requests of NASA for the performance of such work as we desired and the Army felt could be done without interference to its military projects. It is too early to say if this arrangement will be adequate for our needs. The Army has given every assurance of an earnest desire to be fully cooperative within the framework of existing limitations. For our part, we intend to make the fullest use possible, under these circumstances, of the extraordinary capabilities at ABMA.

While these events were taking place, the organization of the NASA headquarters staff was pressed forward. Rather naturally and depending upon their capabilities, former NACA personnel have undertaken NASA staff work. There were, however, limits beyond which this procedure would have been unwise. One obvious reason was that we could not afford to wreck the organization of the smoothly functioning research side of our new house in order to fill our other staff requirements.

This whole business of staffing has been very difficult and time consuming. In my opinion, the importance of our mission makes mandatory our getting the very best people for the top jobs, and I think that in this direction at least, we have done reasonably well. We have attracted very good people—from universities, the Rand Corp., the military services, and elsewhere in Government.

Another NASA acquisition was the Presidential transfer, on October 1, of certain programs and projects already underway. I offer for the record a copy of the Executive order covering these actions which included, for example, the study contract the Air Force had with Rocketdyne Division of North American Aviation to determine the feasibility of undertaking development of a single-chamber rocket engine in the 1½ million pound thrust class. Included also in these transfers were the Vanguard project, and several Air Force and Army space probes under the administration of the Advanced Research Projects Agency of the Department of Defense.

I should like to say a special word about the Vanguard project and the 157 highly trained people under Dr. John P. Hagen who transferred with him from the Naval Research Laboratory to NASA so they could continue working on this and future space programs. I believe I can speak objectively about this undertaking because very real benefits had accrued from the Vanguard project before NASA took it over.

The components of Vanguard—the rocket stages—were of competent and advanced design. As you know, the second stage Vanguard rocket has been put to good use, in combination with the Thor IRBM rocket motor, in the Thor-Able propulsion system that powered some of our Pioneer space probes.

FOUR MORE VANGUARD LAUNCHINGS THIS YEAR

There are four Vanguard vehicles remaining, and these we will be shooting early this year.

Over and beyond the vehicle, the Vanguard project has been valuable because of the experience it provided, early in the space era, in such matters as telemetry, tracking, trajectory planning and plotting,

vehicle firing, and so forth. These are the kinds of experience one can acquire only through actual practice; they result in skills we can use to the Nation's profit in the days ahead.

Let me speak about the future.

There is no question in my mind but that the business of a bold, imaginative long-range national program to permit attainment of our objectives as stated in the Space Act is one of our most imperative tasks. The Space Act says that it shall be the duty of the President to, and I quote—

> develop a comprehensive program of aeronautical and space activities to be conducted by agencies of the United States.

The President has assigned to NASA the development of the national space program, working, of course, in closest cooperation with all other elements of our Government, particularly with the Department of Defense.

Our method of attack has been to deal substantively with each of the major elements of the problem.

At the beginning, we had to face up to the fact that we do not have available booster rockets sufficiently powerful to put into orbit or send on long journeys into space, the size payloads required to obtain the scientific information that is needed. This fact is made no more palatable by realization that today and for some time to come, the Soviets have the rocket boosters necessary to send into space heavier payloads than we can manage.

The reason for this unhappy situation is that in the years after the war, when as a nation we were largely preoccupied with building the millions of automobiles and the many other items of convenience and luxury that have become an essential part of our way of life, there was no subtantial effort in the United States to develop big rocket engines. In Russia in those early postwar years, very great effort was focused on their big rocket development programs, with results that have been spectacularly demonstrated by the sputniks and luniks. These are facts we must face. I want to state categorically that I am not interested in what we didn't do or why. My only concern is in what we are doing now.

NASA AND DOD HAVE INTEGRATED BOOSTER AND ROCKET PROGRAM

What we need is a whole family of new rocket boosters and upper-stage rockets that, used singly or in combination, will give us the amounts of thrust we need to accomplish our missions in space. Because these boosters of varying capabilities are necessary for both military and civilian space programs, NASA undertook the development, with DOD, of an integrated program aimed at correcting this situation as soon as humanly possible.

Our national booster program will provide substantial increases in our capability to send larger payloads into space. It is based on a minimum number of rockets that will be used as building block units in combination to meet expanding mission requirements. By midsummer of next year, a new, second-stage rocket engine, when used with an Atlas, will permit us to put approximately 6,000 pounds of payload into orbit, or send approximately 1,000 pounds of payload as far as the moon. Please note, I said payload. Another rocket

engine now being developed, also for use as the second stage of vehicles using the Atlas or Titan booster, will have been completed by early 1961—little more than 2 years from now—which will enable us to put 8,000 pounds of payload into orbit, and send a 2,000-pound payload to the moon. NASA and DOD are working together in the development of these and other upper-stage rocket motors.

A third step, one which will pay off in operational flights in 1962, is the clustering of existing big rocket motors, to provide a first-stage booster having a thrust of 1½ million pounds. Engines for this cluster, procured under DOD auspices, are now in production, and the engineering on the total power package is well advanced. It will permit us to put 10 tons of payload into orbit and to send 2 tons of payload into deep space, far beyond the moon.

Work has been pushed on the development of a single-chamber rocket booster designed to deliver 1 to 1½ million pounds of thrust. We are determined that this new engine be brought to a stage of usefulness inside of 4 years; within 2 years thereafter we believe we will have learned how to cluster four of these giant rocket motors, to provide a first-stage booster with 6 million pounds of thrust. With this new engine, we will be able to send 75 tons of payload into orbit; with it we will have the power capability to land a man on the moon. This big engine project is under NASA management, and here is how quickly we have moved. NASA became operative October 1. Two weeks later we invited the Nation's rocket makers to a briefing October 21, at NASA, to discuss development of a truly big rocket engine. October 23, we sent NASA specifications for such an engine to seven contractors. On November 24, six of the seven submitted proposals for the development of this single-chamber engine. December 12 we had completed our review of the bid proposals, and selected the Rocketdyne Division of North American Aviation, Inc., as the source for the new motor.

CONDUCT ACTIVE EXPERIMENTAL PROGRAMS UTILIZING NUCLEAR ROCKETS

The booster programing I have outlined is based on chemical rockets where the state of the art is furthest advanced. Of equal importance, and being pursued with vigor, is the development of propulsion systems that will utilize nuclear energy. Active experimental programs on nuclear rockets are being carried on, and ground tests will begin soon. This work is being carried on in cooperation with the Atomic Energy Commission. From my experience as a Commissioner with the AEC from 1950 to 1952, I have great faith in the capabilities of the scientists and engineers of that fine organization in an undertaking of this kind.

Another promising field is that of propulsion systems using ion and plasma jets. Research here is in the early stage of theoretical and applied effort. Prototype systems are under investigation in NASA and other laboratories.

So far, in this discussion of programs and progress, I have been talking about the engines we need and are developing. These are, of course, vital to all of our space activity.

But there are other technological aspects of space vehicle systems that also can make the difference between success and failure for our

ventures into space. Advanced guidance and control systems—these are some of the other elements that demand, and are receiving intensive effort.

Still another areas—and again I have to say that we must perfect our facilities if our payloads moving in space are going to mean very much—is the ground equipment we need for global tracking data acquisition, communication, and data processing. Here again, NASA and DOD are working very hard to assure early establishment of a worldwide network that will be adequate to both the civilian and military space needs. One facet of this program calls for installation this year of four large antenna dishes at strategic locations around the world. Together with the Goldstone, Calif., 85-foot antenna dish that the Jet Propulsion Laboratory operates for NASA, these installations will provide a network that on a 24-hour basis will track either satellites or deep space probes traveling hundreds of thousands of miles.

Other aspect of this program include modernization and extension of the existing minitrack network, and adding other stations; establishment of a tracking network for Project Mercury; sharing the use of the worldwide communications network now in existence, and operation of two data reception and analysis centers that will be mutually supporting.

TRANSMISSION OF INFORMATION FROM SPACE VEHICLES

As this work goes on, we are also improving our communications capabilities. As Americans, we will of course be proud when our space probes first reach the vicinity of Venus and Mars. But these will be hardly useful exploits unless the new information gathered by the instruments in the probe payloads can be successfully sent to receiving stations back on Earth. That, incidentally, is why development of the lightweight, long-life nuclear power package by AEC that goes under the name of "SNAP" is so important to the overall space program.

Under the terms of the Space Act we are enjoined to—

> arrange for participation by the scientific community in planning scientific measurements and observations to be made through use of aeronautical and space vehicles, and conduct or arrange for the conduct of such measurements and observations.

Programing and planning in this area of the design and packaging instrumentation payloads for scientific experimentation has been proceeding well. As you know, the Space Science Board of the National Academy of Sciences has been studying the problem of what data-gathering experiments the scientific community most want to be sent into space. There has been no dearth of proposals from this and other sources.

We have sought the advice of the Space Science Board on the scientific merit and priorities of the types of measurements to be made in space, and have received their suggestions as to qualified groups to attack various problems. On the basis of this and other advice from our staff and outside, NASA has formulated its programs and negotiated with various groups for development of data-gathering instrumentation and subsequent data analysis.

In 1959, for example, we have scheduled more than a dozen satellite and space probe launches, together with 40 sounding rocket flights. In 1960, we will be launching a number of satellites and space probes. The scientific payloads of the 1959 firings have been pretty well determined, and those for 1960 are now being firmed up.

Meantime, we are keeping the scientific community advised about the size of the payloads we will be sending into space in the years ahead and they are busy planning for the best use of those future capabilities. To give a single example of the questions our scientists have to answer: What kind of apparatus can you devise, within all the rigorous limitations that will apply, that will enable us to determine whether there is living matter on Venus or Mars? There is no simple, easy answer, but one needs to be found in the not distant future.

The overall national space program must, of course, include many other activities in the areas of rendezvous techniques, orbiting laboratories, and other advanced missions. It is too early to say much about the planning work in these areas, other than to give assurance that we are chewing away at this problem as vigorously and as enthusiastically as we can manage.

MAN, HIMSELF, IS THE BEST PIECE OF INSTRUMENTATION

One of the major purposes of our national space program is, as I have previously indicated, the gaining of a better understanding of the Earth on which we live, of the Moon and the planets, and of the nearby and distant space environment. Until now, I have refrained from discussing a second major purpose of our national space effort, attainment of the ability for man himself to travel into space, when he will, where he will, and as far as he will. There may be some who will, at first, wonder about the usefulness of attempting manned flight into space in view of the present limited state of knowledge of the space environment. But man, himself, is the best piece of instrumentation about which we know. No amount of instrumentation can tell us as much about the Moon, or Venus, or Mars, as man himself will be able to report, once he has visited those distant spheres.

There is another aspect of manned space flight which, in my opinion, is of utmost importance. Sending man safely into space is an arm-stretching, mind-stretching undertaking that thrills every one of us, and demands from every one of us the very best we can muster. It is, perhaps, a focal point for all our energies, all our enthusiasms, all our determination. It will result in much earlier development of the technology needed for other difficult space missions.

On January 12, we selected McDonnell Aircraft Corp. to build the capsules we hope to use to send man into orbital flight, within the next couple of years. We are calling upon every scientific and technological capability of the Nation that can contribute to this program, and we are finding the response uniformly generous. Even before—perhaps before the end of this calendar year, we will—so to speak—have stretched our big toe into the edges of space—in the X–15. When this project was conceived 7 years ago by the old NACA, the idea of man reaching a speed of a mile a second and an altitude of as much as 100 miles—well, it sounded fantastic to even the most farsighted. And now, the cooperative X–15 effort, in which the military services, the

aviation industry, and NASA are working as a team, seems and actually is only a tiny step in which the problems of space flight can be studied full scale.

We are very busy today, doing what needs to be done on a right-now basis. We do have long-range plans—we are sharpening them, coordinating them, and doubtless we will be revising them constantly, as future progress dictates. We won't be sending the largest payloads into space for some time to come, but the payloads we do shoot skyward will provide information of the greatest value. We are developing the capability to send up payloads of the desired size.

In the 4 months since NASA became operational, we have made substantial progress. We know that continued progress is required at an even faster rate. We are well on our way. We are moving faster every day.

Senator STENNIS. All right, Doctor, you may proceed. Do either of you other gentlemen have prepared statements?

Dr. STEWART. No.

Senator STENNIS. Afterward, Mr. Vance will lead with the questioning and, as I understand it, the committee would like to question these three gentlemen together.

All right, proceed. Do you want to make some points?

Dr. GLENNAN. I have no points to make. I would be perfectly happy to answer the questions Mr. Vance may have.

Mr. VANCE. Dr. Glennan, I will address my questions initially to you but please do not hesitate at any time to refer any of the questions to Dr. Stewart or Dr. Pickering.

At the time that the hearings of this committee were opened last year, the first witness, Dr. Teller, testified with respect to the significance of Sputnik I, which had just been put into orbit. I would like to ask you now if you could tell us what is the significance of the Lunik which has recently been launched by the Soviet Union?

Dr. GLENNAN. Mr. Vance, I would answer that by saying that it seems to me this is further evidence of the scientific capabilities of the Soviet Union and of their undoubted ability to direct the efforts of their scientists in any direction which they please.

Mr. VANCE. What can you tell us about the thrust which is evidenced by the launching of the Lunik?

Dr. GLENNAN. I am not an expert in the field of estimating the thrust of a propulsion vehicle, but it seems evident to me that this vehicle must have had a substantial amount of thrust, probably substantially more than those which we have available to us.

Mr. VANCE. I wonder if either Dr. Stewart or Dr. Pickering, who are technical men in this field, could amplify.

Dr. STEWART. I could amplify a bit here. The interpretation that you put on a feat like this——

Senator STENNIS. Pardon me, Doctor, watch your microphone.

Dr. STEWART. The interpretation that you place on a feat like this in terms of the thrust of the powerplant is dependent on your estimate of how advanced they are in their technology.

WITH ADVANCED TECHNOLOGY THRUST OF LUNIK WOULD BE RELATIVELY LOW

If they were indeed very advanced in their technology, then the thrust would be relatively low. If they were using lower level equipment, then the thrust might be very high indeed.

For example, with the kind of laboratory equipment that we work with, a feat of this sort might be done with a thrust as low as perhaps a quarter of a million pounds.

On the other hand, if you use relatively poor equipment, it could be as high as a million. So your interpretation is very much dependent on the level of excellence that you assume for their engineering.

Mr. VANCE. What do you estimate was the thrust of the Lunik?

Dr. STEWART. I would say somewhere from a quarter million to a half million pounds.

Mr. VANCE. What can you tell us with respect to guidance as evidenced by the Lunik?

Dr. STEWART. Here again our statement is tentative because we do not know what they intended to do.

If indeed they intended to do exactly what they said they did, then they are very good indeed.

Any sensible mission, any sensible intention that I can read into their effort leads to the conclusion that their guidance is of good quality, of the best kind of quality that we are building for our own military weapons.

Mr. VANCE. Wouldn't the evidence indicate, by the time of the month in which they fired, that they were attempting to either hit the moon or come very close to it?

Dr. STEWART. I think it is obvious they were trying to come very close to it, at least.

Mr. VANCE. Assuming that they were trying to hit the moon, and passed as close to it as they did, what does that indicate with respect to their guidance?

Dr. STEWART. It indicates that their guidance is of a suitable military quality.

Mr. VANCE. Would you amplify what you mean by that?

Dr. STEWART. To come as close as they did—let us make the assumption that they tried to hit the moon and missed it. This is one thing you could say. In this case the estimate that I made, on rather poor grounds of the velocity and accuracy that they termed, was on the order of 10 feet per second.

This is the same kind of accuracy that is necessary for weapon use. It is not quite as good as what we would like to have for the most refined weapons, but it is still good enough so you can use it with a weapon.

CIRCLE OF PROBABLE ERROR 15 OR 20 MILES

Mr. VANCE. When you say it is good enough for weapon use, do you mean it is good enough to guide an ICBM to a target?

Dr. STEWART. Yes.

Mr. VANCE. With what type of a circular probable error?

Dr. STEWART. Fifteen or 20 miles.

Mr. VANCE. Dr. Pickering, do you have anything to add with respect to the guidance question?

Dr. PICKERING. No; nothing.

Mr. VANCE. There has been some talk to the effect that the Lunik was in fact never launched or did not achieve the objectives which are reported to have been achieved.

Can you tell us whether or not it actually was tracked and how far?

Dr. GLENNAN. I think Dr. Pickering, whose laboratory operates the Goldstone facility in California, might give you the best answer to that.

Dr. PICKERING. At the Goldstone facility we modified the facility after we had word of the launching, modified it to listen on the reported frequencies and attempted to track it when it should have passed over the Pasadena area on early Saturday morning, the launching being on a Friday.

We were not successful at that time. However, during the day, Saturday, we examined our equipment, made a number of improvements in it, and early Sunday morning we repeated the attempt and this time we did receive signals from the vehicle for a period of several hours.

These signals were on the reported frequency of 103.6 megacycles. They were definitely from a point in space near the moon.

Mr. VANCE. Did you track it past the moon?

Dr. PICKERING. At the time we were tracking the point was to the west of the moon and was moving away from the moon.

Mr. VANCE. Is there anything else that any of you can tell us with respect to the Lunik which is of significance?

Dr. PICKERING. There have been a number of other reports of signals being received in this country on the frequencies near 20 megacycles. Again these were reports of relatively weak signals, but the signals were received on Friday evening and Saturday morning.

Mr. VANCE. Is it your opinion that the Lunik in fact did achieve the reported results of going on out past the moon and perhaps into orbit?

Dr. PICKERING. Yes, it is.

Mr. VANCE. Dr. Glennan, I wonder if you could review for us the payloads in the successful satellite launchings which the United States has had and then do the same for the Russian satellites.

Dr. GLENNAN. This is a reasonably lengthy reply to your question, but I will go through it. The Explorer I, which was launched on February 1, 1958—are you asking for the types of payloads or the exact weights of them?

Mr. VANCE. The weights of payload.

Dr. GLENNAN. 30.8 pounds weight in orbit, and Explorer III launched on March 26 total weight placed in orbit, 31, of which 18.56 pounds is the actual instrumented payload.

Explorer IV placed in orbit on July 26, 1958, with a total weight in orbit of 38 pounds with an instrumented payload weight of 25.8.

OUR GREATEST PAYLOAD WEIGHT 150 POUNDS

Vanguard I placed in orbit on March 17, 1958, with a total of 57.1, but a payload weight of only 3.4 pounds, and then the Atlas vehicle placed in orbit with a total vehicular weight in orbit of 8,700 pounds, as of December 18, 1958, a payload weight of 150 pounds.

With respect to the Russian successes, their Sputnik I, launched on October 4, 1957, had a payload weight in orbit of 184 pounds, a total weight of 330 pounds, as reported.

Sputnik II, launched on November 3, 1957——

Mr. VANCE. May I interrupt just a minute? What did you mean by "total weight"?

Dr. GLENNAN. That is the carrier of the instruments.

Mr. VANCE. You are not talking about the entire missile, are you?

Dr. GLENNAN. No; I am not.

Sputnik II, launched on November 3, 1957, a 2,000-pound total carrier weight in orbit, if you will, with a payload of 1,120 pounds.

Sputnik III, launched on May 15, 1958, a total weight, carrier weight, of 3,550 pounds, with a payload weight of 2,925 pounds.

Mr. VANCE. Could you give us the payload weights with respect to the two lunar probes which the United States has attempted in comparison with the Lunik?

Dr. GLENNAN. The first attempt at a lunar probe which propelled the payload into outer space, about 71,000 miles, was 30 pounds and the second, 12.9 pounds. The reported Russian probe, 794 pounds, as I remember it.

Mr. VANCE. What was the final stage weight of the Lunik?

Dr. GLENNAN. It seems to me that that was reported at about 2,900 pounds.

That is the total of the payload and the final stage weight as propelled outward into outer space.

Mr. VANCE. Can you give us any comparison between the instrumentation in our vehicles as opposed to the Russians?

Dr. GLENNAN. I think I would ask Dr. Pickering to answer that question. He has been very familiar with the analyses of this kind.

Dr. PICKERING. In a general way the explorer satellites, for example, have carried instruments to measure the radiation in space, also to make engineering measurements of temperatures, micrometeorites, and the like.

The Russian satellites——

Mr. VANCE. Would you speak closer to the microphone?

SAME TYPE OF MEASUREMENTS CONDUCTED ON ALL SATELLITES

Dr. PICKERING. The Russian satellites have likewise made radiation measurements including some perhaps a little more extensive than the sort we have done and likewise have measured temperature and micrometeorites, so that just in a very general way the same type of measurements have been conducted on their satellites as on ours.

The number of experiments reportedly carried on their satellite vehicles was greater than the number carried on any one of our shots.

Mr. VANCE. Is there any reason to believe that their instrumentation was not of a high quality?

Dr. PICKERING. There has not been a great deal of, shall we say, detailed scientific reporting yet of the results.

The instruments which they have displayed as having been flown on the satellites are instruments which look perfectly satisfactory as far as general appearance is concerned, but, of course, with the weights which were available to the Russians, there has been no particular attempt to miniaturize the instruments.

In our case we have made our instrumentation very compact and lightweight.

In their case they have not apparently made any particular attempt to do this.

Mr. VANCE. What sort of instrumentation was there in the Atlas which was put in orbit?

Dr. PICKERING. You mean in addition to the tape recording?

Mr. VANCE. Whatever instrumentation there was.

Dr. PICKERING. The communications experiment involving the reception of signals, recording, and playback equipment primarily.

Mr. VANCE. Anything else?

Dr. GLENNAN. Nothing that I know of.

Senator WILEY. Mr. Chairman, might I ask a few questions out of order? I have to go to another meeting.

Senator STENNIS. Yes. Will you yield to Senator Wiley?

Mr. VANCE. Yes.

Senator STENNIS. Senator Wiley?

Senator WILEY. Of course, to you scientists many of these things mean a lot, and we want to know what they mean to us. How do you know the total weight of these Russian rockets? How do you get at that information and how do you get at the information as to the payload weight?

And then to an ordinary layman, what is the significance of the weight in this age of challenge?

Dr. GLENNAN. We know, Senator Wiley, only what the Russians tell us about the exact weights of the devices that they place in orbit.

Senator WILEY. That is what I thought. We have had 52 agreements with them and they have broken 50 of them. Have you any reason to doubt their statement? Do you think there is any exaggeration in what they are saying or have you just accepted their statement as to the total weight and as to the payload weight? Is that right?

Dr. GLENNAN. Dr. Pickering has asked to enlarge on that a little bit.

AS FAR AS WE CAN SEE THERE IS NO REASON TO DOUBT REPORTS

Dr. PICKERING. I would like to enlarge on that, Senator. In the first place, it is, of course, correct that the only precise statements we have are the statements they give us. They have displayed equipment, of course, at the Brussels Fair and the Industrial Fair in Moscow and so forth, the equipments which were allegedly flown, and these equipments, of course, are consistent with the weights and sizes which were reported. At the same time, there are some indirect measurements which one can make.

In other words, take for example the rocket cases which accompanied these final stages.

These rocket cases, of course, are visible, and by taking photographs through telescopes one can make a rough idea of the size of the rocket case which is in orbit, and again by watching the decay of the orbit, the fact that these things eventually come back to earth, the rate at which they come back to earth is dependent upon the weights and areas of the objects, and when we look at all these things and put them

together, we do not arrive at precise values of the weights, but we arrive at values which are not inconsistent with the values which the Russians report, and as far as we can see, there is no reason to doubt the figures which have been reported by the Russian scientists.

Senator WILEY. Then if I get the gist of your recent remark, it is that you have some scientific way of checking their statements, not accurately——

Dr. PICKERING. Roughly.

Senator WILEY. To a certain degree.

Dr. PICKERING. Yes.

Senator WILEY. That is as far as I want to go on that. The next is, you obtained the information from the Russians themselves, didn't you?

Dr. PICKERING. Yes.

Senator WILEY. Is what you have said now also true in relation to the instrumentation?

Dr. PICKERING. Yes. The reports on the instrumentation are the reports which they give us.

Of course, we have no way of checking this except just their statements.

PAYLOAD WEIGHT IS ACTUAL WEIGHT OF INSTRUMENTS

Senator WILEY. What is the significance of this comparison between total weight and the payload weight, and what do you mean by the payload weight as distinguished from the total? Is one a part of the other? What do you mean by the payload weight?

Dr. GLENNAN. Senator Wiley, the payload weight in these experiments is the actual weight of the instruments which are carried aloft to make measurements in the atmosphere.

Senator WILEY. Pardon me, because your associate there says that there is a way of getting at the total. There isn't any way of differentiating between the total and the payload weight.

Dr. GLENNAN. I think not, sir.

Senator WILEY. Well, we have agreed on that.

All right. Now what is the significance of the total weight and the payload weight in this age of challenge?

Dr. GLENNAN. I think, Senator Wiley, that it does us no great good to doubt that the Russians have real capabilities in scientific fields.

Senator WILEY. That is not my question. My question did not mean that. What is the significance of their having what you now feel they have in this age of challenge?

Dr. GLENNAN. Simply the ability to place larger weights in orbit than we can.

Senator WILEY. Placing larger weight in orbit. What is the significance of that?

Dr. GLENNAN. It would mean that if they had as sophisticated instrumentation as we have they could make many more simultaneous measurements than we can make from a single flight.

Senator WILEY. What is the importance of the added thrust that you spoke of?

Dr. GLENNAN. The same importance—that they can place larger weights in orbit if they have a sophisticated vehicle system.

Senator WILEY. Does it have significance in relation to guided missiles?

Dr. GLENNAN. I think that the miiltary people can answer that question better than I, Senator Wiley.

There is a difference between the use of these vehicles for space applications and for missile applications, I am sure, and perhaps one of my colleagues would like to enlarge on that technically.

Dr. STEWART. There are differences; in particular, the specific requirements of what you want the missile to do are somewhat different.

SATELLITE EFFORT HAS OBVIOUS MILITARY IMPLICATIONS

But, on the other hand, there are great resemblances, too, so there are obvious implications for their military effort from their satellite efforts.

Senator WILEY. One final question. In view of your testimony this morning, gentlemen, what is the conclusion that you want the American people to draw?

Dr. GLENNAN. I would say, Senator Wiley, that we should be about this business of space exploration with a great deal of energy, and that is exactly what I think we are doing.

Senator WILEY. Have we been doing that?

Dr. GLENNAN. I think in the past year tremendous strides have been made.

Senator WILEY. Have you any anticipation as to what further exploration will do in relation to maintaining the safety of this country?

Dr. GLENNAN. I think that the safety of this country is made up of a wide variety of elements.

One of these is military potential. Another is the relationship which this country has with the rest of the world. I think that in this age of technology to be in the absolute forefront of the nations of the world in exploration in all fields of science is of immense importance.

Senator WILEY. And size, then, is the significant thing. We are changing a little bit in the automobile field, as you know.

Dr. GLENNAN. Size is not necessarily the most significant thing, and yet it is necessary that we move ahead and be able to do the things that we want to do in space at a time when we want to do them, and that I think we are moving toward.

Senator WILEY. That comment that size is not the most significant thing, what is the most significant thing?

Dr. GLENNAN. The scientific information that we are able to bring back so that we can better understand the universe in which we live.

Senator WILEY. Haven't we been getting that out of what we have been doing?

Dr. GLENNAN. We have been getting some of it, but we cannot get as much as we should. For instance, there is no substitute for the judgment of a man, and we hope one of these days to have a man in a space vehicle who can bring back some value judgments on the things that he is experiencing there.

Senator STENNIS. Gentlemen, excuse me, but I think we are compelled to return to the regular order now. We adopted a rule here the other day that counsel would have brief questioning and then each Senator would get 5 minutes.

Senator WILEY. I want to thank you very much.

Senator STENNIS. I say we are very glad indeed to suspend that rule for Senator Wiley who is compelled to be elsewhere shortly. But otherwise, we hope we can follow the regular rule which gives the witness and the members of the committee a better chance.

Mr. Vance.

NASA HAD NO HAND IN LAUNCHING ATLAS SATELLITE

Mr. VANCE. Before asking you a general question, I would like to ask whether or not NASA played any part in the launching of the Atlas satellite?

Dr. GLENNAN. We did not, sir.

Mr. VANCE. Dr. Glennan, can you give us your conclusion as to how we stand as compared to the Russians in respect to space exploration and development? In other words, are we ahead, are they ahead, and how far is the party which is ahead ahead?

Dr. GLENNAN. Mr. Vance, I think in the results of space exploration to date the distance between us is a little difficult to measure. We have gained a very great deal of information from our activities in this field. At least the information published by the Russians has not seemed to be very much different from that published by ourselves nor of any greater quality perhaps, in some instances of less quality.

I think the one element in this picture where the Russians seem clearly to have superiority is in their ability to propel larger devices into orbit and into deep space than we can.

Mr. VANCE. Is it your opinion in the overall that we are on a par with them or that we are behind them?

Dr. GLENNAN. In the overall I would think that we, speaking scientifically, are on a par with them. I think you must put into this story, however, the propulsion side of the activity which allows them to do some of the things with larger vehicles which we would like now to do but which we can't.

Mr. VANCE. Dr. Glennan, let me read you a statement which has been made by Dr. Krafft Ehricke. Then would you tell me whether you agree or disagree with him.

The present Russian lead is generally estimated to be about 18 to 24 months. Actually, the lead varies depending on the program under consideration. Also a lead is not only expressible in terms of weight. Most importantly the present lead is not yet really harming the United States, except in a psychological extent. At this early stage of the game space superiority itself implies no immediate consequences in terms of space. However, even a 12-months lead 3 years from now may be very consequential and a lead, even if progressively smaller, becomes potentially more dangerous with each successive year since superiority in space technology will, to an increasing extent, become synonymous with superiority in space power.

Dr. GLENNAN. I think that is a reasonable statement.

Mr. VANCE. Dr. Pickering, have you made any studies on the basis of the perigee and orbits of the sputniks as compared with the orbits of our satellites which would shed any light on the guidance problem?

CLOSENESS OF RUSSIAN PERIGEES MAY HAVE SIGNIFICANCE

Dr. PICKERING. If one looks at the three Russian satellites, it turns out that the three of them have perigees which are quite close. If I remember the numbers, 139 miles, 141 miles, and 150 miles.

If one makes the assumption that all three rockets were supposedly to be fired with the same perigee, then this of course says that the accuracy in attaining this perigee was reasonably good, a spread of about 10 miles in 3 shots.

As far as our own rockets were concerned, the spread in the perigee on the 3 explorers in orbit is very much larger, roughly from about 120 miles to 220 if I remember the spread, so that all one can say here is that the system used to launch the Russian satellites into orbit, if again one is assuming that the 3 of them were supposed to have the same perigee, and if one also assumes the 3 of ours were supposed to have the same perigee, then obviously they did better.

There are clearly a lot of assumptions in here, of course the most significant being the question of just how sophisticated guidance systems were used.

In our case, the final guidance necessary to put the object into orbit was a relatively simple type of guidance and the accuracy attained was about what we expected.

In the case of the Russians, of course, we do not know.

Mr. VANCE. Thank you. Dr. Glennan, your organization was brought into being only a short while ago but I would like to ask you some questions with respect to it.

Has your organization been completely staffed at this point?

Dr. GLENNAN. The organization of NASA has not been completely staffed at this point. I think that it could be said that the major portion of the top administrative jobs have been filled, but we will continue to grow as the program grows over the next year or two, perhaps beyond that.

Mr. VANCE. Are there any important areas where there are still vacancies, positions which have not yet been filled?

Dr. GLENNAN. I think in some of the secondary echelons we are still seeking top grade scientists. I think our problem here is really to get the best, not just to get someone to fill those posts.

Mr. VANCE. Dr. Glennan, section 201 of the Space Act provides for a Space Council, and subsection (f) of that section, provides for an executive secretary for the Space Council. Has an executive secretary been appointed?

Dr. GLENNAN. No, sir.

Mr. VANCE. Can you tell us why not?

ACTING EXECUTIVE SECRETARY HAS BEEN APPOINTED FOR SPACE COUNCIL

Dr. GLENNAN. An acting secretary has been appointed for the first few months of the activities of the Council, and I suspect it was the President's desire to determine the real activities to be undertaken by the Council and the extent to which such a staff should be employed.

As I recall the act, the appointment of such a staff is permissive.

Mr. VANCE. Has the permanent staff of the Council been appointed as yet?

Dr. GLENNAN. There is an acting secretary and two assistants to that gentleman, Mr. Franklin Phillips.

Mr. VANCE. Now with respect to the Council, how often has the Council met?

Dr. GLENNAN. The Council has met four times in the 4 months that we have been active.

DR. GLENNAN LISTS MATTERS CONSIDERED BY SPACE COUNCIL

Mr. VANCE. What types of matters has the Council considered in these meetings?

Dr. GLENNAN. Among the matters that have been considered by the Space Council in these meetings have been the organization of the Civilian-Military Liaison Committee, established October 30; a discussion of a national space policy; transfer of functions to NASA, that is the Vanguard and other satellite activities which came to us from the DOD by Executive order; the transfer of JPL, Jet Propulsion Laboratory of Pasadena, Calif., which came to us by Executive order; the agreement between the Department of Defense with respect to the use of the Army Ballistic Agency by NASA; discussions of the development of international cooperation in this field; development of a U.S. public information policy in this field; concern over Project Mercury, and the pace at which it should proceed.

Mr. VANCE. What is Project Mercury?

Dr. GLENNAN. Project Mercury is man in space. The priorities to be accorded these particular programs, and most recently the initiation stages of the development of a national booster program and a national tracking program.

Mr. VANCE. Have these been general discussions or has the Council been called upon to advise the President?

Dr. GLENNAN. The Council has been called upon to advise the President in most of these instances. To a considerable extent, of course, in the initial meetings of the Council there has been a certain amount of briefing for orientation purposes, and so forth.

Mr. VANCE. Does it advise the President in writing or does a member of the Council present it orally?

Dr. GLENNAN. The activities of the Council are all oral. There has been no written advice given by subcommittees or by the full committee, or the Council, to the President.

Mr. VANCE. The President is Chairman of the Council is he not?

Dr. GLENNAN. The President is Chairman of the Council.

Mr. VANCE. Section 204 of the Space Act sets up a Civilian-Military Liaison Committee. Subsection (b) of section 204 reads:

> The administration and the Department of Defense, through the Liaison Committee, shall advise and consult with each other on all matters within their respective jurisdictions relating to aeronautical and space activities and shall keep each other fully and currently informed with respect to such activities.

Has this Committee actually been set up?

CIVILIAN-MILITARY LIAISON COMMITTEE ORGANIZED

Dr. GLENNAN. This Committee was set up on October 30 of 1958. The members have been appointed. Three meetings of the committee have taken place, and it is my understanding that there is a meeting scheduled for next week, Mr. Vance.

Mr. VANCE. Who is Chairman of this Committee?

Dr. GLENNAN. Mr. William Holaday.

Mr. VANCE. Have any formal procedures been instituted under the mandate provided for in the Civilian-Military Liaison Committee specifying how the Department of Defense and NASA will keep each other informed?

Dr. GLENNAN. I think, Mr. Vance, these procedures are in the process of formulation at the present time.

I believe that Mr. Holaday is to testify before you at a later date and perhaps you could get more definitive information from him.

However, it is apparent to me from some of the information coming to my desk that the exchange of information is indeed proceeding as we would like to have it proceed.

Mr. VANCE. Could you amplify on that a bit?

Dr. GLENNAN. We now are receiving information through the CMLC on projected firings of the ARPA group. They have made recommendations to the Department of Defense with respect to priorities which ought to be accorded to various programs. They have acted as a clearinghouse for the assignment of military personnel to certain of our projects, matters of this kind.

Mr. VANCE. Am I correct that to the best of your knowledge no formal procedures have been set down in writing at this point?

Dr. GLENNAN. I have not received copies of any formal procedures in writing at this point.

Mr. VANCE. Who from your organization sits on the Committee?

Dr. GLENNAN. Dr. Dryden, Dr. Stewart, Dr. Silverstein, and Mr. Abbott.

Mr. VANCE. Dr. Stewart, perhaps you can tell us whether or not any formal procedures have been developed as of this time?

Dr. STEWART. I can give one example. I am not sure exactly what you are aiming at, but let me give this one example which might enable me to clarify the question.

One of the problems that we have in NASA is that we need to know the history and the development status of the large military booster rockets, and in considerable detail. There was an exchange of correspondence establishing the procedure by which this kind of information could be transferred from the Department of Defense to NASA, and the work is going ahead in accordance with this exchange of correspondence.

Is that an example?

PROCEDURES FOR INTERCHANGE OF INFORMATION SET UP IN PARTICULAR CASES

Mr. VANCE. What I was trying to get at in a rather clumsy fashion is, have you got any method of operation set up which specifies how you go about communicating with one another on a regular and orderly basis?

Dr. STEWART. We have a regular schedule of meetings. We have regular points at which agenda items are produced for the exchange. I think the proper answer to your question is "Yes," in a number of ways, as I have illustrated, and I could point out examples.

Mr. VANCE. But not across the board?

Dr. STEWART. Not across the board.

Mr. VANCE. Dr. Glennan, the Space Act provides for the transfer of necessary activities and facilities to NASA. Have all the necessary activities and facilities been transferred to NASA at this time?

Dr. GLENNAN. That is a very broad question, Mr. Vance. We have been in business only 4 months, officially in business since October 1. We have had transferred to us those facilities which we have asked for with one exception.

Whether or not we will require additional facilities in the future is under continuous study.

Mr. VANCE. Let me ask the specific question: How did the machinery for coordination of space activities work in the case of the proposed transfer of the Jet Propulsion Laboratory and ABMA for the Department of Defense and NASA?

Dr. GLENNAN. We initially sent task force teams to a variety of installations of the Army, the Air Force, and the Navy to determine their capabilities that might be applicable to our own activities as we then saw them, and I would remind you that these activities are evolving every day.

As a result of those visits certain recommendations were made to me by the staff, and we undertook to discuss with, in this case, the Secretary of Defense and his Deputy the transfer of certain of these facilities. We have, as I say, been successful in achieving those transfers in all except the one case of ABMA, where we have worked out what for the time being seemed to be quite satisfactory and adequate relationships, and our program is going ahead very well there.

I would remind you too that in the agreement providing for the activities of ABMA being made available to us, that the Space Council is to have a report from the two agencies within a year.

Mr. VANCE. The Jet Propulsion Laboratory——

Senator STENNIS. Pardon me, what agency is it that you will hear from within a year?

Dr. GLENNAN. The NASA and the Army Ballistic Missile Agency at Huntsville, Ala.

Senator STENNIS. That matter was postponed, then, in that way?

Dr. GLENNAN. The matter was not quite postponed, Senator Stennis. We did come to an agreement with the Army providing for their taking care of whatever projects we wish to place with them.

That is going forward at the present time.

Senator STENNIS. Proceed, Mr. Vance.

ASSOCIATION BETWEEN JPL AND ABMA CONTINUES

Mr. VANCE. The Jet Propulsion Laboratory and ABMA were a team, were they not?

Dr. GLENNAN. They were associated. I think the use of the word "team" is being prostituted a little bit, if I may say so. They were associated very effectively in work related to the space business, and they will continue to be so associated even though now they are under contract to NASA rather than the Army.

Mr. VANCE. What projects is ABMA working on for NASA at this time?

Dr. GLENNAN. They are working on a lunar probe, and I would like to reterm that for you, if I may.

This is a deep-space probe which will be fired somewhere in the vicinity of the moon. It is not intended to hit the moon. They are working on a communications satellite for us.

They are working coordinately with Jet Propulsion Laboratory on a study of boosters for deep-space missions. We have placed with them orders for 18 propulsion vehicles for use with Project Mercury, the Man-in-Space Project. Discussions are proceeding with them with respect to the development of upper stages for the clustered booster under development at ABMA under orders from ARPA.

Discussions are in a reasonably final stage with respect to support by NASA of certain supporting research activities at ABMA in the fields in which they have particular qualifications.

Mr. VANCE. Maybe it is oversimplifying it, but are they in effect acting as a supplier of vehicles for you?

Dr. GLENNAN. They are acting as a contractor to us to carry out missions as awarded to them.

Mr. VANCE. I believe you said that they were working on a clustered engine of large thrust, and as I understood it, NASA is working on a single-chamber engine of large thrust.

Does it make sense to have these two projects in two organizations?

Dr. GLENNAN. In the best of all possible worlds, I would suspect it would not make very much sense, but it is a fact that ARPA had started that project, had it well underway at ABMA and the transfer of the project at that stage would have gained little in speeding it up. Now we are keeping very very close to that project, as indeed we are asking them to keep close to our pursuing the million- to million-and-a-half-pound single engine which is under development.

SPACE COUNCIL CONSULTED ON ABMA DECISION

Mr. VANCE. Was the Space Council consulted with respect to the ABMA decision?

Dr. GLENNAN. Yes; this is quite correct.

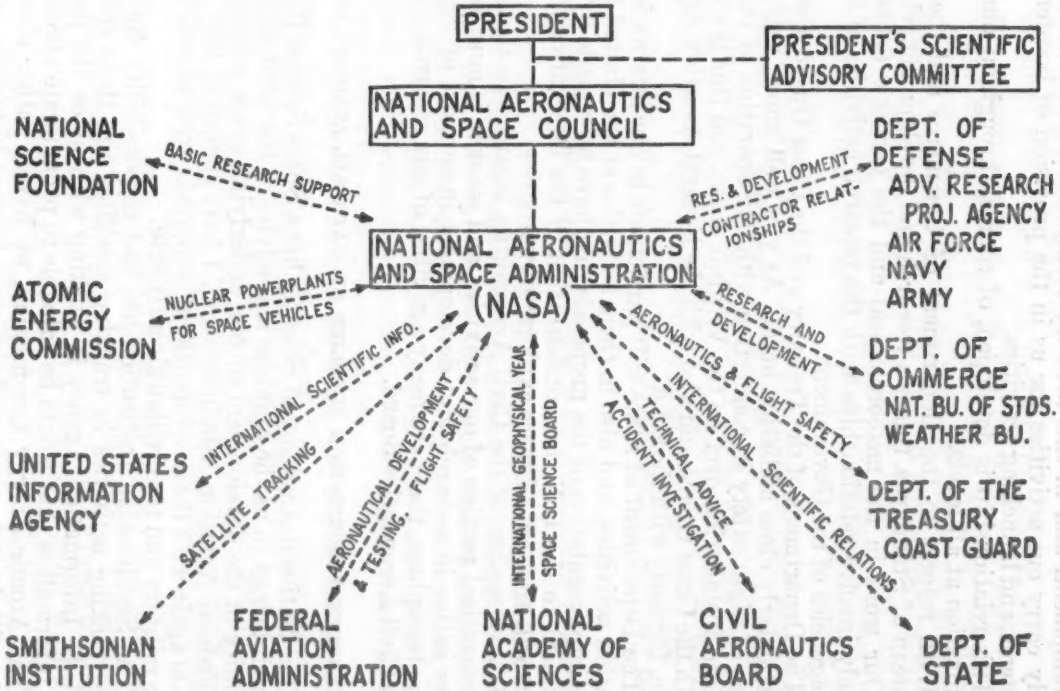
Mr. VANCE. Dr. Glennan, you supplied to the committee a chart showing the general areas of scientific cooperation between NASA and other Federal activities. It looks rather complicated, as most charts do, and I am sure it is probably a lot simpler. I wonder if you could briefly explain to us the relationship of NASA to the various organizations shown on the chart?

Dr. GLENNAN. I think I can do this. If we can go around the chart clockwise——

Senator STENNIS. Just a minute, can everyone see the chart?

(The chart referred to is as follows:)

GENERAL AREAS OF SCIENTIFIC COOPERATION BETWEEN NASA AND OTHER FEDERAL ACTIVITIES



Senator STENNIS There is one in the book if you cannot see it readily here.

Perhaps with the aid of the one in the black book we can proceed.

Dr. GLENNAN. Proceeding around the chart clockwise, our relationships with the Department of Defense are in the fields of research and development, and in this area the Army and the Air Force particularly carry out activities for us in the provision of boosters, booster systems, and launching activities.

This relationship is developed, of course, throughout our total organization at all levels.

With respect to the Department of Commerce and the National Bureau of Standards, this is a research and development relationship.

Our work in the meteorological and the geodetic fields will certainly involve relationships with the research activities of this group of agencies of the Government.

The Department of the Treasury and the Coast Guard, there is not a particularly close affiliation here. As you well know, we have problems of flight safety in connection with our operation of the Wallops Island installation over on the Virginia coast, and this is coordinated with the Coast Guard and also with the Federal Aviation Administration, formerly with the CAA.

The Department of State will participate in our international cooperation activities, and also in their activities at the United Nations in the implementation of the proposals that have been made by this Government to the U.N. for consideration of the international problems that will arise out of space exploration activities.

I have spoken of the Civil Aeronautics Board. In the aircraft or aeronautical portion of our activities, and we still, it must be said, are very active in research and development in support of flight within the atmosphere, there are many activities of our research centers with the Civil Aeronautics Board.

SCIENTIFIC INFORMATION SUPPLIED BY NATIONAL ACADEMY OF SCIENCES

The National Academy of Sciences has a Space Science Board set up which brings to us the opinions and advice of the total scientific community in the development of our underlying space science program.

Federal Aviation Administration, I have spoken of this. This has to do again with the development of important areas of activity in both the military and the civilian aircraft field.

The Smithsonian Institution has had responsibility for certain of the tracking activities in tracking satellites and these space probes.

U.S. Information Agency is working with us on the development of information that would be valuable to promulgate abroad.

The Atomic Energy Commission, we have a rather close relationship with because there we have great interest in nuclear powerplants for space travel, and we also have a really great interest in the development of auxiliary powerplants which can provide the energy that is necessary for extended periods of time in space, hopefully in relatively small packages and of relatively small weight.

The National Science Foundation conducts a basic research support program, active in many areas that are of interest to ourselves.

We coordinate with them so that their policies and ours are not at variance.

Mr. VANCE. Dr. Glennan, thank you very much. Could you tell us what procedures and methods have been established for coordinating the activities of these various departments and agencies with NASA at this time?

Dr. GLENNAN. Again, Mr. Vance, I would remind you that we have been in business only 4 months, but I think we have made a considerable amount of progress in this matter.

At the technical level, there is no problem of relationships. Our engineers and scientists are in close contact with the work of the Atomic Energy Commission. There are meetings back and forth quite regularly. Since we are supplying some of the funds that are necessary to these activities, we have a real interest and a responsibility.

In connection with the work of the State Department and the USIA, we have established an Office of International Cooperation and have begun the manning of that Office by the appointment of a Director of the Office.

We are in reasonably constant contact with them through that Office.

With respect to the Department of Defense, this again is an activity where the relationships are carried on at all levels. We have the CMLC now in operation and developing its methods of interrelationships, carrying on of these interrelationships. But we have also carried on the tradition of NASA in the establishment of advisory committees.

COMMITTEE STRUCTURE FAILED TO REFLECT GROWING SPACE INTEREST

You may recall that the NASA had some 4 basic committees that had grown with their subcommittees to almost 26; I think it was 26, as a matter of fact. We have revised that committee structure to reflect a little bit more adequately our growing interest in space, and there are now 13 coequal committees consisting of some 15 or more members, each representative of education and industry and of the armed services and of the scientific community.

I think we have lots of channels for acquiring the advice we need.

Mr. VANCE. Dr. Glennan, looking down the road, what problems can you see at this time in coordination of space activities?

Dr. GLENNAN. I think we are going to have a continuing problem in the interpretation of that portion of the act which has to do with the relationships between military space activities and civilian space activities. This is a very fuzzy line to draw.

I have presently no great concern about our ability to resolve this. We are working very well together. There is argument. There always will be, I hope, because only through that will we really make progress.

But I have had no difficulty in really coming to grips with any question which has been posed for us. I think beyond that, the real problem that faces us probably will be one of time. This is the thing of which we are the most short.

Mr. VANCE. With respect to the relationships with the military, as I understand it, you are now using hardware that is already in existence. When you get to the generations farther down the road, the problem will be a much more complicated one; will it not?

Dr. GLENNAN. I would think it might be less complicated actually because we are now jury-rigging devices which are very adequate,

presumably—I am not competent to speak, I am not questioning this—but they are considered by the military to be adequate in their missile program.

As we move down into the second generation of space vehicles which we ourselves, along with ARPA, and there is much from the military in this, designed and built by industry, I think that our problems will become somewhat simpler.

DR. GLENNAN DOES NOT ANTICIPATE JURISDICTIONAL CONFLICTS

Mr. VANCE. Won't the jurisdictional conflicts become more difficult where you are talking about using hardware which is being developed from scratch?

Dr. GLENNAN. I wouldn't think so, Mr. Vance. I do not anticipate this.

Mr. VANCE. Are there any other pressing problems that you see looking down the road?

Dr. GLENNAN. Just time to get this job done.

Mr. VANCE. What do you mean by that?

Dr. GLENNAN. We are working with a very great sense of urgency, Mr. Vance. This fine staff that I have inherited from NACA, the headquarters staff particularly, they are not getting very much sleep these days, and that is the way we are tackling the problem. We have a tough one in that we are trying to organize for a very much larger activity, at the same time carrying on heavy operational responsibilities, and this requires manpower, it requires organization, it requires funding and it requires time.

Mr. VANCE. Does it require more manpower and more funding than you are presently getting?

Dr. GLENNAN. I think at the present state of our operations we are going about as fast as we can.

If we had more money we would probably duplicate some of the things that we are presently doing.

I doubt that we would buy any time. We might at a great cost buy some insurance.

Mr. VANCE. Dr. Glennan, this may be repeating in part but I would like to get it clear on the record. Could you tell us first what the projects are that NASA is currently handling and then could you tell us what your plans are for the future?

Dr. GLENNAN. It is a very long list, Mr. Vance.

If you would let me limit this to some of the more important areas——

Mr. VANCE. Would you do that and then supply the complete list for the record?

Dr. GLENNAN. I will be very happy to do that.

In the first place, we are carrying on a program of underlying space science which is funded, as I recall it, at a level somewhat in excess of $100 million this year, which is intended to provide information about the space environment.

We are carrying on a development program in the booster field which will grow very considerably as we learn more about the problems in this field.

This is a basic activity. We are carrying on this Project Mercury at the highest priority. As you have noted from the newspapers, we

have begun the process of selection of the men who will man the first space vehicles. I think those are the largest of the programs that we have, and as I say, I will be happy to submit for the record a complete statement of the program.

(The material supplied for the record is as follows:)

NASA PROJECTS—PROGRAMED AND PLANNED

I. SCIENTIFIC INVESTIGATIONS—THE MEASUREMENT OF THE PHYSICAL CHARACTERISTICS OF THE SPACE ENVIRONMENT

(*a*) Sounding rockets: Extensive firings of sounding rockets were conducted as part of the International Geophysical Year in first part of fiscal year 1959. This project will be continued during remainder of fiscal year 1959 and fiscal year 1960.

(*b*) Earth satellites: Six satellite launchings to be attempted during remainder of fiscal year 1959 with project continuing during 1960 at an average rate of one firing a month.

(*c*) Lunar probes: Transfer of lunar probes from Department of Defense to NASA was effected by Executive order, dated October 1, 1958. Firings under this program will continue during fiscal year 1959 and fiscal year 1960.

(*d*) Deep space probes: Project calls for two deep space probes in fiscal year 1959 with program continuing in 1960.

II. SATELLITE APPLICATIONS INVESTIGATIONS

(*a*) Communications: Project calls for basic research and development on communications satellites for use in worldwide communications systems. Launchings related to this project to be made in second and third quarters of 1959 and continue during 1960.

(*b*) Meteorology: Project will seek to establish a meteorological satellite capability to make possible within the next decade an operational system having worldwide coverage. Satellite experiments under this project to be conducted during 1959 and continued in 1960.

III. ADVANCED TECHNOLOGY PROGRAMS

(*a*) Manned satellite program: Project aimed at achieving at earliest practicable date orbital flight in successful recovery of manned satellite. Testing of unmanned vehicles for this project to be made in 1959 and 1960.

(*b*) High engine fuel rockets: Project for development of upper stage boosters now under jurisdiction of the Air Force will be transferred to NASA. Basic research for this project now under way in NASA.

(*c*) One million pound thrust single chamber engine: Contract for this project has been let and work is proceeding.

(*d*) Nuclear rocket engines: This project, conducted by the Atomic Energy research for this project now underway in NASA.

(*e*) Other advanced components: Projects being conducted relate to auxiliary power units, solid fuel rocket developments, space engines, advanced booster systems and recoverable boosters. NASA is also supporting projects for tracking, data acquisition, and computing systems required for space flight programs.

In addition to the above catagories of projects, NASA is also actively engaged in an extensive variety of basic research projects at its research centers. A program for fundamental and applied research in the physical, cosmological, life, and engineering sciences is also being undertaken with various universities and private research establishments.

LONG-RANGE PROGRAM IN PROCESS OF DEVELOPMENT

Mr. VANCE. Do you have now a step-by-step long-range program?

Dr. GLENNAN. We are in the process of developing a step-by-step long-range program. As I think I indicated a little bit earlier, we have already taken substantial steps in the development of a long-range vehicle program. This is a program which by the end of

about 6 years ought to bring to us a vehicle which would have about 6 million pounds of thrust.

In cooperation with ARPA in that same program and under the initial responsibility of ARPA a booster of about 1½ million pounds thrust should be available for use in the early 1960's in advance of the time when we will have the single-chamber rocket available, which will then be clustered to give us the 6 million pound capability. That I consider a long-range program at this stage of the game.

The question of long-range programs in the fields of scientific exploration must be laid on year by year, looking perhaps 2 or 3 years in advance, because such a program must be reorganized each year.

As one makes advances in science you may find information which is unexpected. This will change the course of the program. But I think with the space science group that we have we are well on top of that operation.

We have developed the first elements of a national program for tracking of satellites in space vehicles and for the acquisition of data.

This is under continuous review as well. I think we have a substantial amount of work to do in the fields of guidance and control. Now my best answer to your question is that in the 4 months that we have been in operation, I think we have made very, very substantial progress in laying on a forward-looking program and in taking the first steps in developing for the Nation a long-range program.

Mr. VANCE. My time is up, Mr. Chairman.

Senator STENNIS. Thank you, Mr. Vance.

Doctor, I just have one or two observations and one or two questions, and we will proceed on to the other members. I am very much impressed with what you say here. I remember a year ago when we had this matter of change in policy, and we created this agency of which you are the Administrator. We threw a lot of problems into your lap. The idea was though to have your Agency have some real authority.

I know that was one of the main things in the minds of the membership of Congress. Now even though you have been in the operation only 4 months, I feel that you have made some headway, but I get the idea that you are running into some obstacles too.

DR. GLENNAN SEES NO LACK OF AUTHORITY

First I want to mention these 13 committees that you mentioned with 15 members on each committee. They are purely advisory, are they not? You do not have to wait decisions of authority from them, do you?

Dr. GLENNAN. Mr. Chairman, they are purely advisory. I don't wait decisions of authority from anybody.

Senator STENNIS. All right, not from them, but you have to wait decisions of authority from this Council, is that correct?

Dr. GLENNAN. No, sir. The Space Council is advisory to the President, and they take up the items which the President may throw to them. When I have need of a decision, I can go to the President and get that decision.

Senator STENNIS. The Council is merely advisory to the President, and then it is you and the President from there on, is that correct?

Dr. GLENNAN. Yes; I think that would be a reasonable way to state it.

Senator STENNIS. Now this matter that you had sometime in November or December with the Army about the ABMA down in Alabama that you mentioned, I want to be sure that that is clear.

There has been no real decision in that matter yet, but it was merely postponed or taken under advisement or left in status quo for a year? Just what did you say about that? I am not trying to embarrass you. I just want to know what the situation is.

Dr. GLENNAN. We asked for the transfer of the Division of Development of ABMA to NASA's management. In discussions with the Army it was agreed that such a transfer was not in the best interests of all concerned, since it was said to be crippling to the ability of the Army to discharge their obligations in the missile program, and I believe that the missile program has priority ahead of the space program. We therefore came to an agreement which was reduced to writing.

The Secretary of Defense and myself presented this to the President and to the Space Council, and in that agreement there was provision for a review of the operation of the agreement by the end of the year.

To me this means that I have the opportunity, and I shall certainly avail myself of the opportunity, if I think I need it, to ask again for the transfer of this agency, if it seems important.

THE QUESTION OF ABMA COULD BE REOPENED

Senator STENNIS. So it is not final. You are free to move in on this matter again?

Dr. GLENNAN. Yes.

Senator STENNIS. Another point, you mentioned the funds here, and that is an area that Congress does have some responsibility in. You do not feel the need of any additional funds now. That is the substance of what you say?

Dr. GLENNAN. I think that we are adequately funded, if we can have the approval of the amounts which have been proposed to the Congress at the present time.

I would say to you, Senator Stennis, that this is a rapidly moving field, and that if there is need for additional funds, I shall not hesitate to go through proper channels to ask for them.

Senator STENNIS. I think you are correct of course. You are refering now to the forthcoming budget for 1960, are you not?

Dr. GLENNAN. That is right, sir.

Senator STENNIS. When you refer to those funds, there is one thing I want to say. The fact that you appear here before the Congress, and the Congress has the responsibility in public opinion areas as least, it is a great medium of having public opinion behind your program. The fact that you appear here and subject yourself to questioning I think is a very wholesome thing, and lends your agency strength and gives assurance to the American people. You have already covered this matter about the funds.

Now one question along this line. I have been impressed with you different gentlemen emphasizing the thrust that is necessary for satellites and other space objects. That seems to be where we are lagging considerably behind our competitors. I don't know whether you are the one to ask this question, but I think you are.

Will you give any direct timetable on when you expect to have this increased thrust capacity available? I remember one witness said we would be defeated unless we had a million-pound thrust by a certain time. I don't know whether that is high, but this is a matter in the minds of the public—this increased thrust. How important is that and what is the thrust program?

TIMETABLES ON BOOSTER ENGINES

Dr. GLENNAN. I think it is important that we should have increased capacity and capabilities in this field. I think the facts are that we will continuously increase our capabilities, but that the very large step that will be available to us will come when the clustered booster is available to us, which may be within a period of 2 to 2½ years.

Senator STENNIS. Which booster is that?

Dr. GLENNAN. This is the clustered booster being developed under ARPA management by ABMA. The larger single-chamber engine under development by Rocketdyne for NASA has a timetable of perhaps 4 years, with clustering of that in perhaps 6 years to give us 6 million pounds of thrust.

Senator STENNIS. Related to that as a matter of fuels. I suppose you are experimenting on that. That is a part of the picture which you have just been describing.

Dr. GLENNAN. With great urgency, sir.

Senator STENNIS. And that particularly comes within your jurisdiction, does it not?

Dr. GLENNAN. We have a very great interest in this. Also the Air Force and ARPA have an interest in it because they are looking for better fuels for missiles at all times. These programs are well coordinated, sir.

Senator STENNIS. Who has the authority, though? Do you have the authority in that field?

Dr. GLENNAN. We have the authority that we need to proceed. Actually all of the upper stage vehicles of high energy propellants are under the direction of NASA.

Senator STENNIS. Senator Symington is next on the list. Senator Symington?

Senator SYMINGTON. Dr. Glennan, how far back do you feel we are in space development as against the Russians?

Dr. GLENNAN. Senator Symington, the measurement of how far back we are I presume you mean in terms of months or some such thing as this?

Senator SYMINGTON. Progress, yes.

DR. GLENNAN SEES US TRAILING ONLY IN PROPULSION

Dr. GLENNAN. I do not think we are back of the Russians in the space field at all, except in this one field of propulsion, sir.

Senator SYMINGTON. Do you feel that we are ahead of them in the other fields?

Dr. GLENNAN. I think we are at least as good as they are. I don't discount the capabilities of the Russians in this field. I don't think it does us any good to discount them.

Senator STENNIS. Do we have unanimous consent? May we yield to Senator Anderson out of order? He has to leave shortly.

Senator ANDERSON. I have a meeting coming up at 12 o'clock, Doctor, but I was very much interested in this question of thrust.

Senator Wiley asked you if thrust had any significance to guided missiles. Didn't you say that higher specific impulses created the possibility of adding other guidance systems? We are going to depend on inertial guidance. If you had an opportunity by greater thrust to carry a different type of guidance system, would that not be of some importance?

Dr. GLENNAN. If you are speaking of higher specific impulse, Senator Anderson, you may improve the performance of the vehicles you presently have. The question of the amount of thrust necessary for the missile program I think is best answered by the military people, because they know what they are going to carry, and I don't.

Senator ANDERSON. Yes, but they have had great difficulty with certain weapons that they are now testing that they can't test with the guidance system in because it weighs so much.

If you add a second guidance system, you would have to have greater thrust in order to get it off the ground at all, and when you get a clustered booster, you are almost going to have to depend upon fuels we don't even contemplate now, isn't that right?

Dr. GLENNAN. Senator Anderson, I want to be completely responsive to your question, but I would prefer to ask one of my technical colleagues to answer that, if I may.

Senator ANDERSON. You know my interest in it.

Dr. GLENNAN. I know very well your interest in it, and I admire you for it.

NASA HAS PROGRAM IN NUCLEAR FIELD AS TO PROPULSION

Senator ANDERSON. The specific impulse that can develop from a nuclear device is several times higher than the most fantastic chemical fuels we have even dreamed about.

Dr. GLENNAN. This is quite right, sir. As you know, we have a program going in this field.

Senator ANDERSON. Why we don't try to lift these very heavy vehicles with a fuel we think we can have very quickly is something that I have never been able to understand.

Dr. GLENNAN. I think you know, Senator Anderson, that we have a program going in this field.

Senator ANDERSON. I do know, but I say to you, Doctor, that I don't think it is being pushed at all. They are sitting out there waiting to be tested pretty soon. It could have been tested, I feel, in November or December if there was any feeling of urgency.

Now it is put off several months. If you are going to have a vehicle with a million pounds thrust by a clustered booster, you are a long ways away from it, and may not achieve it at all. There are those who believe it can never be done. Couldn't there be greater emphasis on nuclear development?

Dr. GLENNAN. I think that is a matter that can be answered in only one way. Yes, there could be greater emphasis on nuclear development.

But I would say at the same time that we are working in a field where there are many unknowns, and I think we must pursue both the higher energy chemical propellants and the standard fuels which we know are available to us today at the same time that we are doing the nuclear program.

Senator ANDERSON. I would agree that you have to develop chemical fuels. I only think I notice that there isn't much being done with an airframe for a nuclear-propelled device. It is going to wait. That has been transferred to another agency, and I couldn't commend you more highly than I do for the very fine way you have worked with the atomic people. I congratulate you on the fine approach you have taken for it.

I am not surprised at it, but I wish there might be something done with airframes, so that if we did have a successful experiment with Kiwi–A, we could begin building something.

Dr. GLENNAN. I think that if the tests of the Kiwi–A and the desirability of going ahead with an airframe development was shown, there would be no hesitancy about it.

TYPES OF ENGINES IN USE BY RUSSIANS

Senator ANDERSON. Do you have any thought that the Russians are using a cluster in their devices?

Dr. GLENNAN. I would again defer to my technical colleagues.

Dr. STEWART. There have been suggestions that this is the case. I don't know that there is any fact I can refer to that verifies it.

Senator ANDERSON. There have been other statements that they are depending upon the single chamber, placing far more reliance upon it, and I just wonder why we start with a clustered booster that many people think would never get off the ground, and which will be very, very expensive. A number of missiles could be built for the cost of that clustered booster.

Dr. GLENNAN. Senator Anderson, what we are doing here is to put together in a structure engines that have been proven as reasonably reliable engines.

This will give us—we are very certain or we would not be spending the money—the thrust that we expect, 1,200,000 to 1,500,000 pounds, perhaps as much as 2 to 2½ years earlier than we think we can get it any other way.

Senator ANDERSON. Do you have faith in a cluster booster with existing fuels?

Dr. GLENNAN. With the addition of upper stages which ultimately will use what we think to be advanced fuels.

Senator ANDERSON. It has to depend upon advanced fuels.

Dr. GLENNAN. It will depend upon the use of upper stages certainly, and it will be more effective with advanced fuels, there is no question about it.

Senator ANDERSON. I appreciate the chairman asking Senator Symington to yield. I only wanted to get in my nickel's worth about nuclear propellants, because the nuclear industry does not have anybody in any hotels lobbying for their industry. I thank my colleague from Missouri

Senator STENNIS. Thank you, Senator Anderson. All right, Senator Symington.

Senator SYMINGTON. Mr. Administrator, we were talking about the lead or lack of lead of the Soviet in the space field. You say that you believe that we are ahead except for propulsion, is that right?

Dr. GLENNAN. I said I though that we were at least as good as they were except for propulsion.

Senator SYMINGTON. In that connection there have been attempts at downgrading Soviet capacity in the guidance field. I believe Dr. Stewart referred to that while I was out of the room, did you not? This lunik shows that they know something about guidance, doesn't it?

Dr. STEWART. This was my remark, that the only way to interpret it indicates that they have a good competence.

QUESTION OF REVERSING TREND TO SOLID FUELS

Senator SYMINGTON. I am sorry I was not here to hear all the testimony. Now, we hear of the importance of going from the liquid fuel to the solid fuel, and the distinguished Senator from New Mexico has just referred to nuclear propulsion.

Some people feel that because the potential thrust as against weight in liquid fuels is greater than it is in solid fuels, that we may go back to packaged and handable liquid fuels. Would you care to comment on that?

Dr. GLENNAN. May I defer to the gentlemen on my right and left who have been very active in both these fields.

Dr. STEWART. This is a problem that I have been one of the major proponents of, so I am sure I could not do anything else but say I think this is an important question that we must keep in mind and must follow energetically.

Senator SYMINGTON. Thank you, Doctor. Let me say I did not know that you were, but I did get briefed on the west coast by several of the scientists who were very enthusiastic as to the future of liquid fuels, despite the large amount of rationalization about not building any more liquid fuels, the liquid fueled ICBM's, because the Minute Man is just around the corner.

As we both know, that is a great device for cutting 90 percent of any budget, by postponing something on the promise that we will develop something better a few years from now.

Mr. Glennan, I was looking at a chart that some of us made up regarding the agencies involved in this problem of space and science and air. As I understand it, the President of the United States has reporting to him the National Science Foundation, is that right?

Dr. GLENNAN. That's right, sir.

Senator SYMINGTON. And the National Science Board.

Dr. GLENNAN. I am not sure of the National Science Board.

Senator SYMINGTON. And then he has Dr. J. R. Killian, Jr., as his Special Assistant for Science and Technology.

Dr. GLENNAN. That is right, sir.

Senator SYMINGTON. And then he has the Federal Council for Science and Technology.

Dr. GLENNAN. That has not yet been activated, but it is proposed.

Senator SYMINGTON. And then the President's Scientific Advisory Council.

Dr. GLENNAN. That's right, sir.

Senator SYMINGTON. And then he has a special aviation adviser, my good friend General Quesada.

Dr. GLENNAN. That's right, sir.

Senator SYMINGTON. And then he has the National Security Council on this subject periodically.

Dr. GLENNAN. That's right, sir.

Senator SYMINGTON. Also he has the Federal Aviation Agency.

Dr. GLENNAN. That's right, sir.

Senator SYMINGTON. Furthermore he has the National Aeronautics and Space Agency.

Dr. GLENNAN. That's right, sir.

Senator SYMINGTON. And then he has the Bureau of Standards.

Dr. GLENNAN. That's right.

Senator SYMINGTON. And in addition to that, he has the Secretary of Defense and the Joint Chiefs of Staff.

Dr. GLENNAN. Quite right.

Senator SYMINGTON. And the Secretaries of the Army, Navy, and Air Force on matters peculiar to their services, is that right?

Dr. GLENNAN. Yes.

SOURCES OF ADVICE FOR SECRETARY OF DEFENSE

Senator SYMINGTON. Now let's see what the Secretary of Defense has. First, he has the Armed Forces Policy Council to study these matters, right?

Dr. GLENNAN. I don't know the Secretary of Defense's organization as well as I should.

Senator SYMINGTON. I assure you that is correct.

Then he has something called the Institute for Defense Analyses, is that right, under contract to the Department of Defense?

Dr. GLENNAN. That is an independent agency which does provide consulting service to the Secretary of Defense, yes.

Senator SYMINGTON. Right; it is under contract to him I believe.

Dr. GLENNAN. Quite right.

Senator SYMINGTON. And then he has an Assistant Secretary for Research and Engineering, right?

Dr. GLENNAN. Right.

Senator SYMINGTON. An Advance Research Project Agency?

Dr. GLENNAN. Right.

Senator SYMINGTON. A Director of Guided Missiles?

Dr. GLENNAN. Right.

Senator SYMINGTON. And then again he has the Joint Chiefs of Staff?

Dr. GLENNAN. That's right.

Senator SYMINGTON. And then he has the weapons systems evaluation group, right?

Dr. GLENNAN. That is right, sir.

Senator SYMINGTON. Also he has the Defense Science Board?

Dr. GLENNAN. Yes; I think that is correct.

Senator SYMINGTON. And he also has a Secretary of the Army, Secretary of the Navy, and Secretary of the Air Force if something comes up with respect to their services, right?

Dr. GLENNAN. That is right.

Senator SYMINGTON. Let's look at one of the services. Take the Secretary of the Air Force. He has an Assistant Secretary of Research and Development?

Dr. GLENNAN. That's right.

Senator SYMINGTON. And an Assistant Secretary of Materiel?

Dr. GLENNAN. Yes.

Senator SYMINGTON. And then when the Chief of Staff is working only for the Air Force, he reports for the Secretary on that; right?

Dr. GLENNAN. Right.

Senator SYMINGTON. And under him is the Scientific Advisory Board?

Dr. GLENNAN. Usually, yes, sir.

Senator SYMINGTON. And the Assistant Chief of Guided Missiles?

Dr. GLENNAN. This I don't know about.

Senator SYMINGTON. And the Assistant Chief of Air Defense?

Dr. GLENNAN. You must have this right, sir.

Senator SYMINGTON. I think this is right, but I want to be sure that I am right. At least I want you to know about it. Then he has a Chief Scientist?

Dr. GLENNAN. Usually this is correct.

Senator SYMINGTON. Dr. Joseph Charyk, is that correct?

Dr. GLENNAN. That is correct.

Senator SYMINGTON. Then a Deputy Chief of Staff for Materiel and Deputy Chief of Staff for Development?

Dr. GLENNAN. That is right, sir.

Senator SYMINGTON. Then he has all the problems of space and the Strategic Air Command, Air Materiel Command, Air Research and Development Command, Air Defense Command, Tactical Air Command; is that correct?

Mr. GLENNAN. I think those are correct.

Senator SYMINGTON. Then he has the Ballistic Missile Division of the Space Technology Laboratory, which I believe is General Schriever's command, is it not, BMD?

Dr. GLENNAN. That is the Ballistic Missile Division of the Air Force.

Senator SYMINGTON. Yes.

Dr. GLENNAN. General Schriever.

Senator SYMINGTON. Then the North American Air Defense Command?

Dr. GLENNAN. Yes; I think that's right.

Senator SYMINGTON. And then we have special study groups on this subject like Rand, Cambridge, analytic services and universities; is that right?

Dr. GLENNAN. I would think so; yes.

THE PROBLEM OF EFFICIENCY IN A COMPLEX ORGANIZATION

Senator SYMINGTON. Based on this skeletal outline, we have a lot of people that are capable of advising in the space picture. I know you will agree to that.

Nobody has yet answered the chart, which a man who I believe had a lot to do with getting this missile program rolling, Trevor Gardner, put in a national magazine over a year ago, in which he showed there

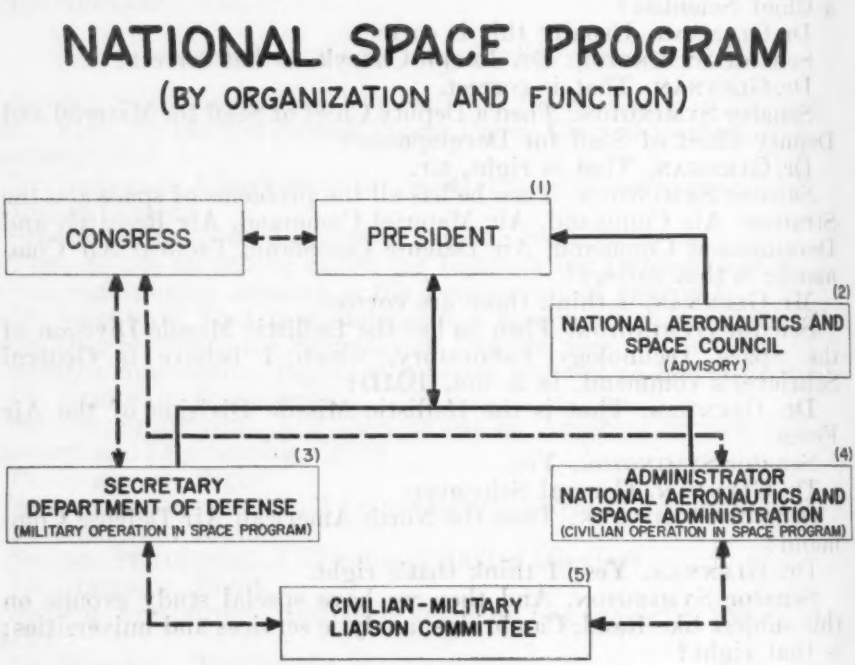
were almost 90 bases which one had to touch in the research and development layout. I understand that the complexities graphically displayed in that chart have been added to considerably since it was published. How are we going to have efficient use of the taxpayers' money in the space field with any setup like this?

Dr. GLENNAN. It is going to be difficult, but we are going to do the best we can. It is a very complicated problem that requires I am afraid a complicated organization. It is not my responsibility to set that organization up.

Senator SYMINGTON. Your responsibilities don't involve the relationship with the military situation?

Dr. GLENNAN. They do, and to date, I have had no real difficulties there. I have been able to resolve the disputes or arguments, differences of opinion in a manner satisfactory to the President.

Senator SYMINGTON. Would you be good enough to furnish this committee with the latest organizational chart structurewise and functionwise of the way that this space situation is going to work, so that we can have it for the record?



REFERENCES

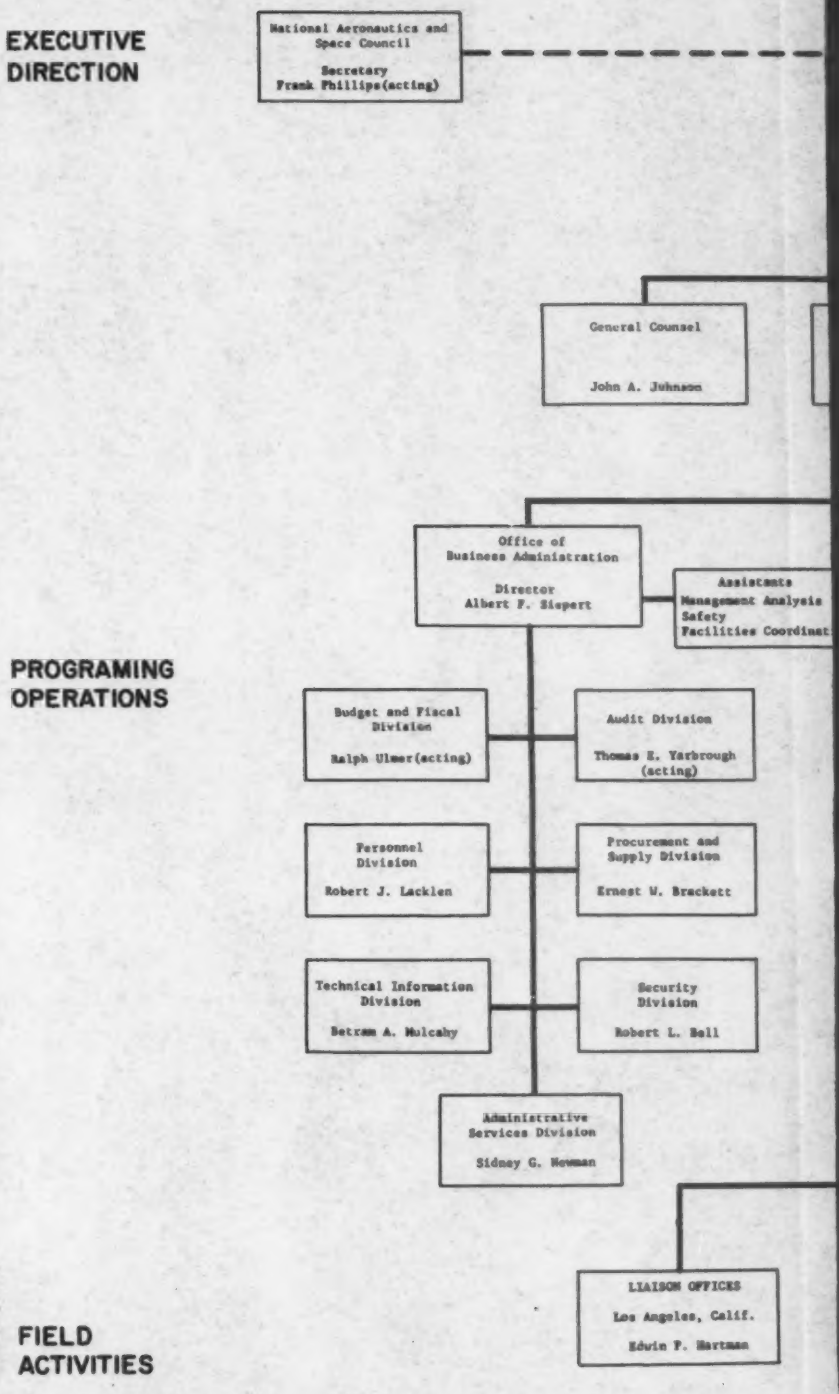
(1) PUBLIC LAW 85-568, TITLE II, SEC. 201(e)
(2) " " " TITLE II, SEC. 201(a)(d)
(3) " " " TITLE I, SEC. 102(b), LINES 6 TO 14
(4) " " " TITLE II, SEC. 203(a)
(5) " " " TITLE II, SEC. 204(b)

Dr. GLENNAN. I will be very happy to do so.

Senator SYMINGTON. I thank you for your courtesy in answering my questions, and I wish you the best of luck.

Dr. GLENNAN. Thank you, Senator.

NATIONAL



Approved: T. Keith Glennan
Administrator, NASA

Date: 29 Jan 1969

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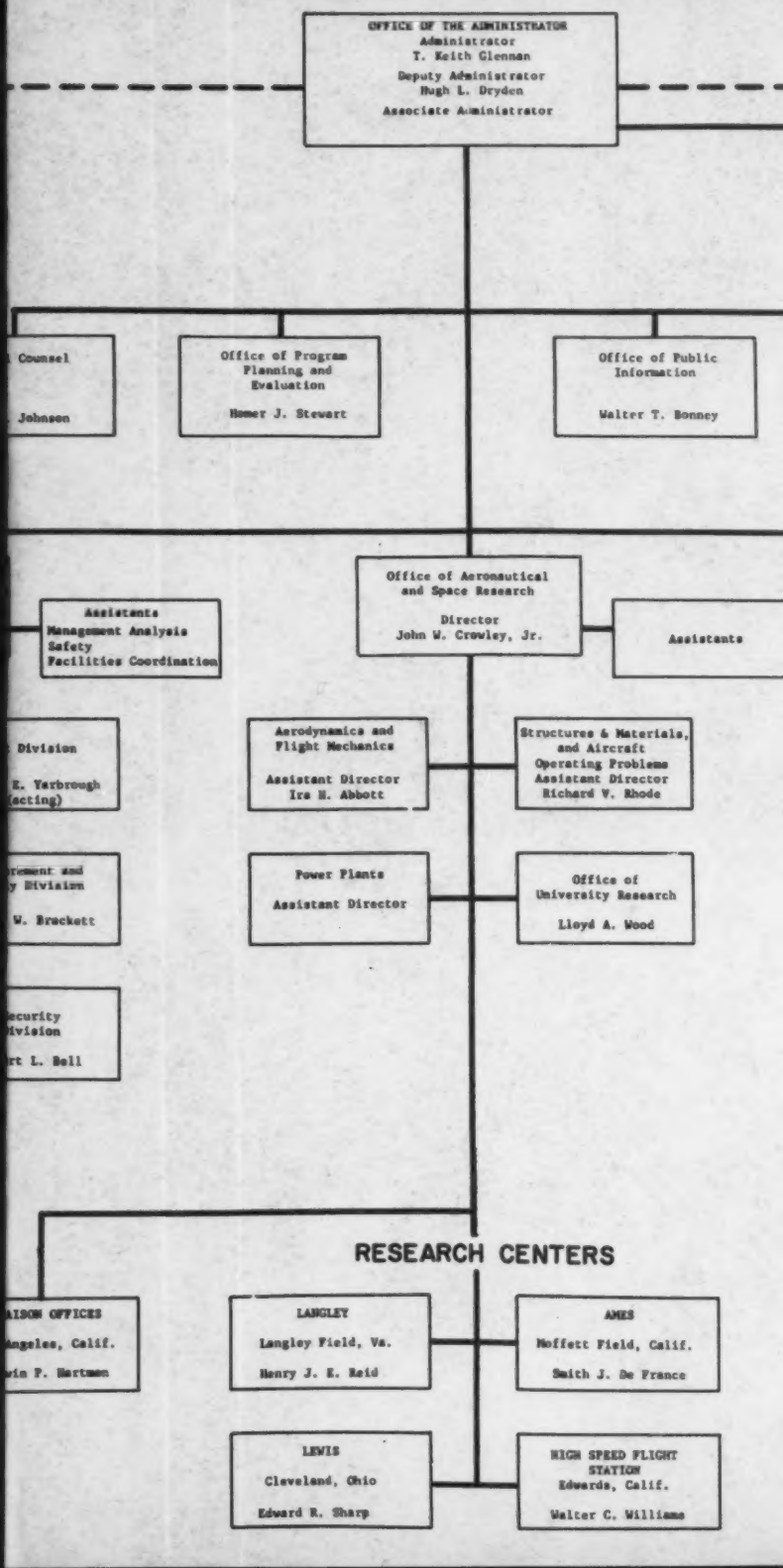
NATIONAL AERONAUTICS AND SPACE ADMINIS



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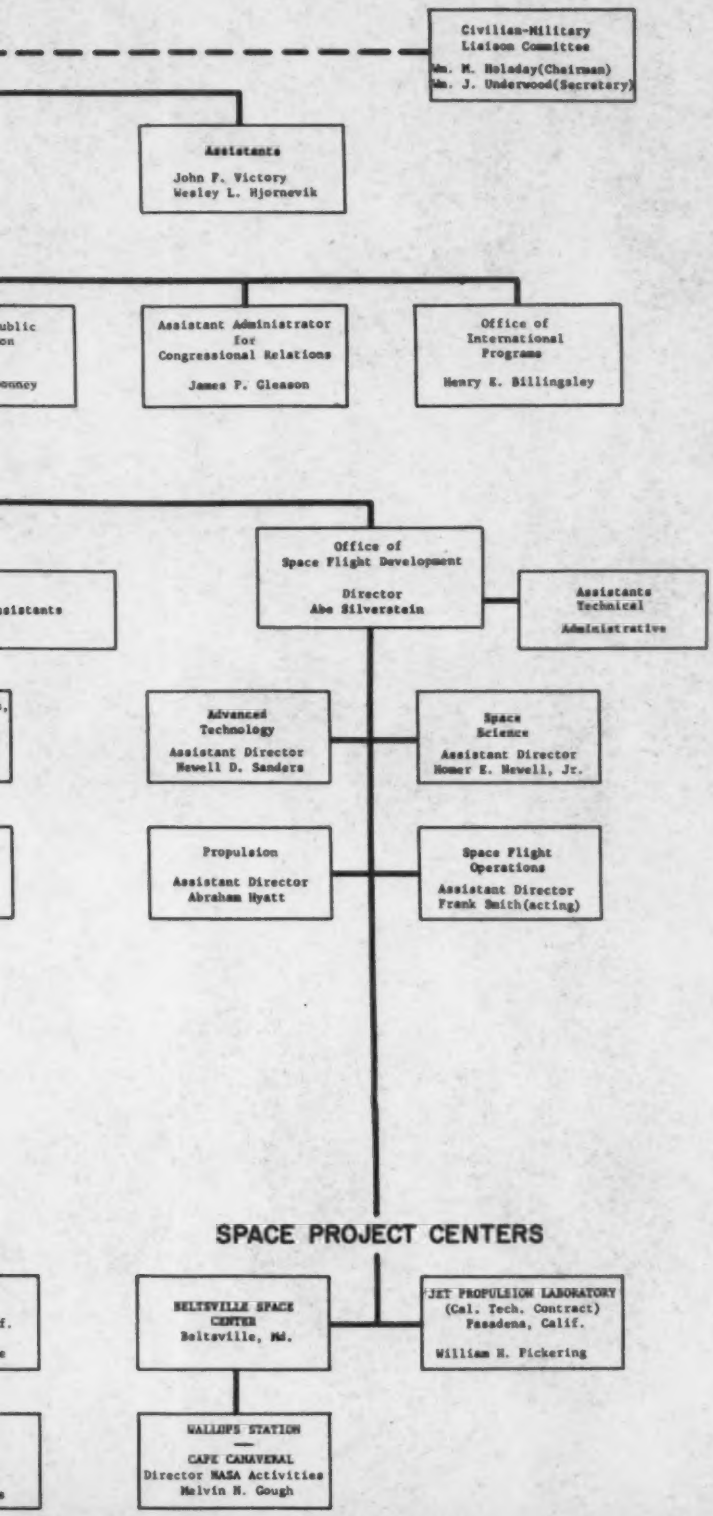

Senator STENNIS. Senator Case of South Dakota?

Senator CASE of South Dakota. Dr. Glennan, I had wanted to ask you questions somewhat along the line that Senator Anderson has asked, and I would like to pursue that a little bit further.

Is it necessary in your judgment to go to a nuclear powerplant in order to get a million pound thrust?

Dr. GLENNAN. No; it is not necessary to go to a nuclear powerplant.

Senator CASE of South Dakota. At Huntsville they have a testing facility down there which has a capacity considerably above the thrust of the rockets they have been developing to this point. Is your problem with the Huntsville facility that of getting access to the use of their testing facilities?

Dr. GLENNAN. No; it is not, Senator Case.

ABMA HAS BEEN COOPERATIVE SO FAR

Senator CASE of South Dakota. Are their facilities available to you then regardless of whether or not the agency is turned over to you?

Dr. GLENNAN. We are having no difficulty at the moment having ABMA accept the projects which we have provided or have asked them to undertake for us.

Senator CASE of South Dakota. With reference to the idea of pursuing the cluster engine idea at this time rather than trying to pursue the maximum through nuclear power perhaps, are you following about the same course that we have in placing some emphasis upon the Jupiter or going ahead with Jupiter rather than Vanguard for getting into orbit?

At least our experience this past year has suggested to me that the Jupiter firings were somewhat more successful, and they used, if I may say it, a more conventional approach and Vanguard used something a little more sophisticated.

In using the cluster of known engines, are you pursuing a somewhat similar principle of using a proven engine rather than going to something where you had to reach out farther?

Dr. GLENNAN. That is exactly right, Senator Case, in order to buy the time to get that capability some years ahead of the time when we might do it in an engine designed specifically to give us in a single chamber that same amount of thrust.

Now you might ask why do we pursue the second, and the answer to that, sir, is that we expect to cluster that engine finally when it is a proven vehicle, a proven article, so that we may ultimately have as much as 6 million pounds of thrust.

Senator CASE of South Dakota. Personally I think it is a very practical approach and a practical decision. I brought up this Jupiter-Vanguard illustration to show how we actually had made an achievement this past year in the Jupiter where, with Vanguard, we were not quite so successful.

Dr. GLENNAN. That is quite right.

Senator CASE of South Dakota. But there are more Vanguard vehicles in existence, aren't there?

Dr. GLENNAN. There are four more which are scheduled for firing the early part of this year.

Senator CASE of South Dakota. And you expect to use them in due course?

Dr. GLENNAN. We do.

NASA HAS RECOURSE FOR ASSISTANCE TO A HOST OF SOURCES

Senator CASE of South Dakota. With reference to the organization, this chart that you have presented is somewhat helpful to me. I share Senator Symington's feeling that we have a great many agencies and councils, and so forth, but this chart is helpful to me in that I can think of these several agencies you have listed around the clock here as suppliers or manufacturers or producers to whom the National Aeronautics and Space Administration can go for a particular job, if you want it done.

Is that the way you are treating them?

Dr. GLENNAN. This is quite right. The law provides that all agencies of Government are to make available to us those elements of their organizations, their advice, their assistance wherever we can use it.

Senator CASE of South Dakota. You might have put another arrow on there and pointed to Congress as a source of money.

Dr. GLENNAN. I think this was a gross omission.

Senator CASE of South Dakota. With reference to the two groups that are listed there between NASA and the President, could you differentiate between the President's Scientific Advisory Committee and the National Aeronautics and Space Council?

Dr. GLENNAN. Yes; the National Aeronautics and Space Council is a group of eight men chaired by the President, this making it nine, of course, which is advisory to him in all matters of aeronautics and space.

The President's Scientific Advisory Committee is chaired by the special assistant to the President for science and technology, Dr. James Killian, and this consists at the moment, I believe, of some 25 eminent scientists in this country who are advisory on all scientific matters throughout the Government.

Senator CASE of South Dakota. You took over the facilities of the National Advisory Committee of Aeronautics; did you not?

Dr. GLENNAN. We did.

WE CANNOT OVERLOOK PROBLEMS OF AERONAUTICS

Senator CASE of South Dakota. Are you converting their facilities to space projects?

Dr. GLENNAN. Senator Case, we continue to have the basic responsibility in this Nation for forward-looking research in aeronautics, as well as the development of the new field of space.

This is interface that is constantly moving. It is a fuzzy line between the two. We are not converting in the sense of changing physically those laboratories.

Naturally some of their programs become more space oriented as time goes on than aeronautics, than applicable only to the aeronautics field.

But I would like to point out particularly that we believe we are going to be flying around this earth for many, many years to come, and that there is a very great deal of work to continue to be done in the field of aeronautics. This we are carrying out.

Senator CASE of South Dakota. Mr. Chairman, I just want to say, if I can, this personal word. Dr. Glennan, while I have had occasion to know something of your work in other fields, I am glad to welcome you in this field.

I was also glad, in reading your statement, to note the appreciation you expressed at the work of Dr. Dryden, your deputy in this matter. I know of some of his work with NACA.

Dr. GLENNAN. Thank you. I could not express that more sincerely.

Senator STENNIS. Thank you, Senator Case. The next gentleman on our revised list here is Senator Martin.

Senator MARTIN. Doctor, your statement on page 7, your comment that you made when you took over the California Institute of Technology Jet Propulsion Laboratory, that was I believe transferred to you from Defense?

Dr. GLENNAN. That's right.

Senator MARTIN. And that stepped up your program considerabiy, as you note here in electronics, guidance, propulsion systems, analysis, and tracking laboratories.

That leads me to question the extent of your disappointment in your not getting the Army Ballistic Missile Agency's talent added to your staff. Is it your opinion that it is necessary primarily for the advancement of your overall program, or that you could add somewhat to the quality of our defense if you had them in your jurisdiction?

Dr. GLENNAN. Our reason for wanting the Army Ballistic Missile Agency's scientific group under Dr. Von Braun was that we believe this to be one of the very best teams in the country in the field of space propulsion.

Senator MARTIN. You could work better as a team if you were brought closer together?

Dr. GLENNAN. It is even more than that, sir. As a part of our organization they would have a real hand in the total development of the booster program. As a contractor to the organization I think you would agree there is less opportunity to meld them into our total thinking.

COMPARATIVE POSITIONS OF NASA AND ABMA

Senator MARTIN. It would be mutually beneficial to your program?

Dr. GLENNAN. I think it would move the space program forward faster.

Senator MARTIN. And it would improve the quality of our defense?

Dr. GLENNAN. I am not sure I can be wholly responisve to that question. The Defense Department, in their reply to our request, indicated that in their opinion the transfer of the Agency would be detrimental to the missile program. This is why we stood aside.

Senator MARTIN. Is that a firm and final decision?

Dr. GLENNAN. It is not, sir. We are to review this within a year.

Senator MARTIN. One?

Dr. GLENNAN. That's right.

Senator MARTIN. One year from now you expect to reach some final determination on that point?

Dr. GLENNAN. Within a year from the date of that agreement, which was December 1, of last year, we would expect to reevaluate

our situation and determine once more whether we felt strongly enough about their being a part of our organization to make another request.

Senator MARTIN. Now should that decision 1 year hence leave you without ABMA in your own operation, how expensive in point of time and in funds would it be to you, NASA, to duplicate or approximately duplicate their project within your own organization? Is it feasible for you to contemplate doing that?

Dr. GLENNAN. It is feasible to contemplate doing it, but it is difficult, and that is exactly the reason——

Senator MARTIN. Would it be tremendously expensive?

Dr. GLENNAN. It would be very expensive in terms of developing a new laboratory, and then staffing that laboratory with highly skilled people. After all, this is a relatively new field, and that is a really fine team.

Senator MARTIN. Would it be very delaying in the advancement of your program?

Dr. GLENNAN. We are trying to minimize any delay that might occur, and thus far I can't say that a delay has occurred.

As we move more rapidly into the development of our own booster program—the Nation's booster program I should say, because in this I want to emphasize that the needs of the military space program are being carried forward—one just doesn't know whether there would be delays. I feel strongly that if there are inordinate delays, I will be speaking about it.

DUPLICATION OF ABMA QUALITIES

Senator MARTIN. Is it possible to say then that you could duplicate the qualities of ABMA?

Dr. GLENNAN. In time I think that one could approximate this.

Senator MARTIN. I have very high regard for their capability and their brilliant achievements. I, of course, am very much interested in seeing that you do work very closely together.

Dr. GLENNAN. We are working very closely together. As a matter of fact, I had dinner last night with General Medaris and Dr. Von Braun.

Senator MARTIN. That is all.

Senator STENNIS. Thank you, Senator Martin. Senator Case of New Jersey?

Senator CASE of New Jersey. Just one question, Dr. Glennan. You have been interested in education for a long time. You have spoken about the importance that this country maintain scientific leadership.

I wonder if you have any comment that you would make on the importance of basic research, the adequacy of present Government as well as private effort in this field.

Dr. GLENNAN. I am very happy to speak about that, Senator Case. I have been very pleased to see the increasing amount of understanding on the part of various segments of our Government of the importance of adequate support, generous support of basic research activities in this country. I do not think they are as adequate as they ought to be as yet. I think more money should be spent. It ought to be provided to the greatest possible extent through private sources. This

seems to me in keeping with the tradition of support of our educational activities in this country.

If, however, there is not an adequate amount of support forthcoming from private sources, then I think that through the provision of larger numbers of graduate fellowships and the support that might be given to some of our institutions in the development of particular laboratories, much could be done.

Senator CASE of New Jersey. Have you any general comment on the quality of education in the United States, its direction and so forth?

Dr. GLENNAN. I had the pleasure, Senator, of being in Russia to look at some of their institutions of higher education last summer. I was impressed by the general quality of the work that was being done, but I was not overly impressed.

Senator STENNIS. You were not overly impressed?

Dr. GLENNAN. That's right, sir. I think that they have set up their educational program alone to serve the purposes of the state, not to develop the individual.

I think, however, that there is much that needs to be done in this country, and I am very happy to see that a great deal is being done, and particularly since the advent of Sputnik I.

NEED TO AROUSE INTEREST IN EDUCATION

But I would like to point out from my own personal experience in this field that the educators themselves have been concerned about this for many, many years, but they have not been able to arouse the public or the Congress to the necessities of real support in these areas.

Senator STENNIS. I would like to endorse your statement on that. Proceed, Senator.

Senator CASE of New Jersey. That is my own very strong feeling. It is in conformity, of course, with the recent report of Dr. Waterman of the National Science Foundation. He said in these words:

> The evidence from other countries and notably the U.S.S.R. shows a determination and national spirit on the part of people which seems to be relatively absent from the American scene.

I take it in general you feel that this is true?

Dr. GLENNAN. I do, sir.

Senator CASE of New Jersey. That is all, Mr. Chairman. Thank you.

Senator STENNIS. Senator Cannon?

Senator CANNON. Dr. Glennan, directing your attention to the Russian claims of an orbit around the sun, may I ask from the evidence you have available do you believe their announced claims, that you have not been able to verify?

AVOID DISCOUNTING RUSSIAN CLAIMS

Dr. GLENNAN. I am inclined to avoid discounting the claims of accomplished fact, of accomplishments in the scientific field that are made by the Russians. I think it does not serve our purposes to discount their abilities.

I have seen it firsthand, the quality of some of their work, particularly in the atomic energy field, and I am inclined to believe that

they did send this device beyond the moon, and presumably then into orbit.

Senator CANNON. And if it has met the claims that they have announced, would that indicate that they are ahead of us in the development of the metals field?

Dr. GLENNAN. I do not know that you can draw that conclusion clearly from this, although I have personally been of the opinion that they have spent more time in basic research—Senator Case would be interested in this—more effort in basic research in the materials field than we have in this country.

Fortunately we are moving ahead rather rapidly under a full head of steam on a broad front in that particular area now.

Senator CANNON. If their claims are believed it would, however, indicate, would it not, that in addition to their being ahead of us in the propulsion field, they are somewhat ahead of us in the metal field?

Dr. GLENNAN. I do not think I could comment usefully on that question. This is a problem of quality, breadth of field, the use that one wants to make of a variety of things, and I am reminded of the fact that we may lose one of the battles, but I do not think we are going to lose the war.

METAL QUALITY WOULD NOT BE LIMITING

Senator CANNON. Let me ask it this way. Assuming that you had the propulsion force necessary for the type of an orbit the Russians are claiming, would it be possible for you to, under your present developed materials, place a satellite in orbit?

Dr. GLENNAN. Senator Cannon, there is no question about that. We could.

Senator CANNON. You could?

Dr. GLENNAN. Yes, sir.

Senator CANNON. And the metal capability would not be limited, would not be a limiting factor for the orbit they are now claiming?

Dr. GLENNAN. Not to my knowledge, sir.

Senator CANNON. Thank you very much.

Senator STENNIS. Counsel, do you have further questions, Mr. Vance?

Mr. VANCE. Just one or two questions, Mr. Chairman.

Dr. Glennan, for purposes of completeness of the record, I wonder if you could tell us, if it is not classified, what kind of an organization the Russians have to control their space prorgam?

Dr. GLENNAN. I don't think there is any classification about it, but it seems to me that about 3 years ago they did set up a committee which was to be involved in the control of space activities. I do not know anything more about the interlacing of that committee with other elements of their government, Mr. Vance.

Mr. VANCE. Is there anything that can be said on the public record with respect to their space program?

Dr. GLENNAN. I do not believe so, sir.

Mr. VANCE. You mentioned Project Mercury, which involves putting a man in space. Could you tell us by whom and where the work is being done to insure that the medical and biological needs of

man in space go along concurrently with the development of the hardware?

Dr. GLENNAN. Yes, Mr. Vance. We have an advisory medical group under the chairmanship of Dr. Lovelace. Represented on that committee are most of the eminent medical people who have been active in the fields of space medicine for the past 10 years.

NASA WILL SUBSIDIZE MEDICAL ORGANIZATIONS

The work which will be done in training these gentlemen who will be the first pilots will be accomplished at Langley, and at the Air Force and the Navy aero-med installations throughout the country.

We do not ourselves propose to develop an aero-med laboratory, but rather to utilize those fine laboratories already in existence supplying them with the funds necesssary to underwrite that portion of our program. I should include in this, of course, the very fine Navy facility at Johnstown, the big centrifuge there.

Mr. VANCE. In your view or opinion, are these being paced concurrently with the delivery of the hardware?

Dr. GLENNAN. They most certainly are, sir.

Mr. VANCE. That is all the questions I have, Mr. Chairman.

Senator STENNIS. Thank you, Mr. Vance. Senator Symington.

Senator SYMINGTON. Mr. Chairman, I have no further questions of Dr. Glennan and his associates. Are we going to question Director Holaday this afternoon?

Senator STENNIS. Yes. I will announce now the afternon schedule, if I may.

Senator SYMINGTON. If the Chair will yield, I want to discuss with Director Holaday some of the various conflicting statements that have been made by members of this administration with respect to the production of missiles. Also, I shall issue at that time a short statement. Thank you, Mr. Chairman.

Senator STENNIS. No further questions?

Senator SYMINGTON. No further questions.

Senator STENNIS. Senator Case of South Dakota?

Senator CASE of South Dakota. No, Mr. Chairman, but I would just say that with two Cases on the committee this morning, I trust that the president of Case Institute of Technology felt very much at home.

Senator STENNIS. Very well said. Senator Martin?

Senator MARTIN. No questions.

Senator STENNIS. Senator Case of New Jersey? Senator Cannon? Mr. Vance?

Mr. VANCE. No, Mr. Chairman.

Senator STENNIS. Do you have any observations you wish to make, gentlemen, yourselves, either of you?

Dr. GLENNAN. I think no, Mr. Chairman.

THE ROUTE TO THE PRESIDENT

Senator STENNIS. We certainly want to thank you not only on behalf of the Congress but the American people for your appearance here, for your very fine attention to the subject matter, the questions. It appears that you are getting involved somewhat in some of the involved procedures of Government. I hope it does not entangle you.

There is one further question I do want to ask. This council here that you said had no power, the National Aeronautics and Space Council, do you have to wait for them to act or advise before you go to the President, is that the situation?

Dr. GLENNAN. No, sir; I do not.

Senator STENNIS. So you are free to take your problem to the President whether they act or not?

Dr. GLENNAN. That is right. I think that the Congress has set up an act under which we have the authority necessary to get on with the job.

Senator STENNIS. I was going to say that is what we intended to do as I understood the matter, and there are not supposed to be any impediments in your way. I am glad to know that you are finding it that way now. Is that correct?

Dr. GLENNAN. That's right, sir; and it is very reassuring to me to have this amount of interest shown on the part of this committee in our activities.

Senator STENNIS. Thank you and we want to thank all three of you, as I say, not only for your time but for your attention and for the work that you are doing. We wish you Godspeed.

As Senator Case of South Dakota mentioned, on this money matter, as I understood it, you were talking about your 1960 budget as to the amount that you are allowed in the budget, not what you requested.

Dr. GLENNAN. That's right.

Senator STENNIS. You think you have sufficient funds to do what you can, and spend what you can in the 1960 budget figures that were approved; is that correct?

Dr. GLENNAN. That is correct at the present stage of our development. I am sure that this field is going to move just as fast in the future as it has in the past, and if we need more money, sir, we will be back.

Senator STENNIS. All right, gentlemen, thank you again.

Now I have an announcement here for the press and the public. This afternoon's session will begin at 2:30. The witnesses will be Dr. Herbert York, Director of Defense Research and Engineering, Mr. William M. Holaday, Director of Guided Missiles and chairman of the Civilian Military Liaison Committee, Mr. Roy Johnson, Director of ARPA, Dr. Wernher von Braun, Director of Development, Operations Division, Army Ballistic Missiles Agency.

Thank you very much, gentlemen. Without objection from the committee we will take a recess until 2:30.

(Thereupon, at 12:30 p.m., a recess was taken until 2:30 p.m.)

AFTERNOON SESSION

Present: Senators Johnson of Texas (presiding), Stennis, Symington, Bartlett, Young of Ohio, Wiley, Martin, Case of New Jersey.

Also present: Senators Engle, Cooper, and Case of South Dakota.

Senator JOHNSON. Dr. York, Mr. Holaday, and Mr. Johnson and members of the committee and guests:

This afternoon we will continue our hearings on the Nation's preparedness and space program. This morning the committee heard Dr. Glennan, Administrator of the National Aeronautics and Space Administration, supported by Dr. Stewart and Dr. Pickering.

The substance of the testimony indicates that the organization of our national space program is still in its infancy. The U.S.S.R. is ahead of us in ability to put heavy objects in space.

But there is a need for positive coordination and direction among the many agencies of the Government active in the space field. This afternoon's witnesses have been for some time now responsible for various facets of the Defense Department's missile and space program. As stated this morning, we want to know the provisions for authority, the methods of coordination, between the Department of Defense, NASA, and many other interested agencies. We want to know the substance and adequacy of our program.

In accordance with our normal policy, each witness will be sworn.

Dr. York, you are Director of Defense Research and Engineering; Dr. Holaday, you have been for some time the Director of Guided Missiles, and are now, in addition, Chairman of the Civilian-Military Liaison Committee; and Mr. Johnson, you are the Director of the Advanced Research Projects Agency. The members of the committee deeply appreciate your coming here to appear before us. We know you will be cooperative and helpful.

If you will all please stand, I shall administer the oath, and then our counsel will proceed with the examination.

Do you solemnly swear that the evidence you are about to give this committee will be the whole truth, and nothing but the truth, so help you God?

Dr. YORK. I do.

Mr. HOLADAY. I do.

Mr. JOHNSON. I do.

TESTIMONY OF DR. HERBERT YORK, DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING; WILLIAM M. HOLADAY, DIRECTOR OF GUIDED MISSILES AND CHAIRMAN, CIVILIAN-MILITARY LIAISON COMMITTEE; ROY JOHNSON, DIRECTOR, ADVANCED RESEARCH PROJECTS AGENCY, DEPARTMENT OF DEFENSE

(The official biography of Herbert Frank York is as follows:)

Dr. Herbert Frank York, born in Rochester, N.Y., received his A.B. in physics from the University of Rochester in 1942. After graduating as Phi Beta Kappa scholar with honors, he remained at the university as a teaching assistant and in 1943 obtained his M.S. degree. Later that year, he joined the staff of the University of California Radiation Laboratory at Berkeley.

Between 1944 and 1945, Dr. York worked on the electromagnetic isotope separation program at the Y–12 Plant, Oak Ridge, Tenn. Returning to Berkeley, he entered the University of California graduate school, while continuing part time at the laboratory.

In 1949, Dr. York received his Ph. D, in physics from the University of California. Later, in 1951, he became an assistant professor of physics for the university. In 1950, Dr. York, a coleader with Dr. Hugh Bradner, undertook the design and execution of a major diagnostics experiment for Operation Greenhouse at Eniwetok Proving Ground.

In July 1952, when UCLA expanded its research program to include weapons development and other classified programs in applied science, Dr. York was selected to lead the laboratory program at Livermore, Calif. Under his supervision, the laboratory made major contributions to the varied research programs of the Atomic Energy Commission. Dr. York became an associate director of the University of California Radiation Laboratory and director of the Livermore Laboratory in 1954.

DR. YORK CAME TO DEFENSE DEPARTMENT IN MARCH 1958

Dr. York, on March 15, 1958, became Director of Research, Advanced Research Projects Division of the Institute for Defense Analyses and Chief Scientist of the Advanced Research Projects Agency of the Office of the Secretary of Defense in the Pentagon, Washington, D.C. Dr. York has served on many governmental advisory committees—among these are the Air Force Scientific Advisory Board, the Army Scientific Advisory Board, and the President's Science Advisory Committee.

On December 24, 1958, President Eisenhower appointed Dr. York as Director of Defense Research and Engineering.

Dr. York is married to the former Sybil Dunford of Berkeley, Calif. They have three children: Rachel, Cynthia, and David. They reside in Alexandria, Va.

(The biography of Roy W. Johnson is as follows:)

Mr. Roy W. Johnson was born in 1905 in Michigan City, Ind., and was graduated from the University of Michigan in 1927. Most of Mr. Johnson's career, starting in 1930, was spent with the General Electric Co. in various administrative capacities. He was vice president and executive vice president, from 1938 to 1958.

During World War II he was associated with the War Production Board. The latter period of this tour of duty he was Director of the Facilities Bureau.

Effective April 1, 1958, he resigned from the General Electric Co. to become the first Director of the newly created Advanced Research Projects Agency of the Department of Defense in Washington, which, as its name implies, directs specialized advanced research projects including military outer space and defense from ballistic missiles.

Mr. Johnson resides on Wire Mill Road in Stamford, Conn. He was married in 1927 to the former Ellen Lehtinen of Peterboro, N.H., and they have one daughter, Kristine, age 12.

(The biography of William M. Holaday:)

Mr. W. M. Holaday was appointed by the President on October 30, 1958, as Chairman of the Civilian-Military Liaison Committee provided for in the National Aeronautics and Space Act of 1958.

Pending organization of the new Directorate of Research and Engineering in the Department of Defense, Mr. Holaday continues to serve as Director of Guided Missiles, a position to which he was named on November 15, 1957. Prior to that, Mr. Holaday was Special Assistant to the Secretary of Defense for Guided Missiles. From January 31, 1956, to May 2, 1957, Mr. Holaday was Deputy Assistant Secretary of Defense in the research and development field.

Mr. Holaday retired in February 1957, from the Socony-Mobile Oil Co. where he had been director of research from 1944 to 1955. He had been associated on a part-time basis with the fuels and lubricants group of the Department of Defense Research and Development Board and its successor, the Office of the Assistant Secretary (Research and Development).

Born in New Vienna, Ohio, in 1901, he was graduated with a bachelor of mechanical engineering degree from Ohio State University in 1925, and spent the next 2 years as a development engineer with the Westinghouse Air Brake Co. In 1927, he joined the laboratory staff of the Standard Oil Co. of Indiana as an automotive engineer.

In 1937, he was named assistant manager of the general laboratories of the then Socony-Vacuum Oil Co. and became director of research in 1944.

During the war years of 1943 and 1944, Mr. Holaday was on leave of absence from the company to serve with the Petroleum Administration for War. Since 1944 he has served as a member of the Military Petroleum Advisory Board and, in a consultant capacity, for the Army, Navy, and Air Force.

Mr. Holaday, a member of the Subcommittee on Aircraft Fuels of the National Advisory Committee for Aeronautics, served as Chairman of that Committee's Fuels Subcommittee. For a period of time he served as a member of the Power Plants Committee for the NACA.

A member of the Society of Automotive Engineers, Mr. Holaday served as its vice president in 1942. He also is a member of the Institute of Chemical Engineers, the Petroleum Institute, the Society for Testing Materials, and the Industrial Research Institute.

Mr. and Mrs. Holaday reside in Alexandria. They have two sons—Dr. William J. Holaday, who lives in Detroit, Mich. and Charles R. Holaday, who is residing in Wilmington, Ohio. One daughter, Martha, attends the University of North Carolina, at Chapel Hill.

Mr. JOHNSON. Mr. Chairman and members of the committee, I welcome this opportunity to appear before you to discuss the overall approach which the Department of Defense is pursuing in its efforts to insure that the United States achieves a superior capability to operate in space in defense of this Nation and the free world. We fully recognize that we must develop both scientific and military space systems. As Director of the Advanced Research Projects Agency, I am charged with addressing myself to the latter.

We must have a fully diversified and versatile military space program to accord the United States a position of strength during the many trying years ahead of us. This is true simply because of the potential threat from outer space. We must understand that our security problem is not similar to that of the aggressor insofar as military space applications are concerned. The aggressor does not have to resort to complicated and expensive space activities to achieve early warning against surprise attack. We must have that alarm bell. The aggressor does not require the diversified strategic retaliatory posture as a deterrent to general war that we must have.

ARPA LOOKS FORWARD 10 TO 15 YEARS

Whatever else we may do, it is readily apparent that we must proceed with a well integrated scientific and military program aimed at achieving supremacy in outer space. With these considerations constantly on our minds, we, in the Advanced Research Projects Agency, are seeking to project our thinking and our development programs to time periods 10 to 15 years from now, when the United States will, as a matter of its own national security, require the capability to operate maneuverable vehicles in outer space, in much the same manner as our jet aircraft now perform; when we will require manned artificial and natural space platforms for support of fully maneuverable spacecraft.

Some comment on manueverability is in order. Thus far, space activities have been limited to orbital, or preset trajectory type flights. We must begin now to look to the development of true mobility in space for the defense and deterrent requirements of the free world. Such mobility will involve the use of manned maneuverable space vehicles, receiving logistic support from immense space platforms. Our plan is to move in this direction as rapidly as supporting technology can be developed.

Naturally we must accomplish an orderly series of requisite steps to obtain these long-range objectives. To begin with, we are building our military space projects upon the vast range of defense-sponsored research which has been accomplished over the past several years. We are building on a solid foundation.

To a very significant extent, our present space effort is related and indebted to prior aeronautical, missile, and other defense and industrial research and development. The military space program has not only inherited a wealth of knowledge and experience from previous Defense research, but also a tremendous capital investment of billions of dollars.

Thus, our space achievements of today and for the next year or so are based not only on accumulated experimentation, but upon substantial outlays, byproducts of very expensive missile predecessors.

FOR THE PRESENT WE DEPEND ON THOR, JUPITER, ATLAS AND TITAN BOOSTERS

The inheritance is a lucrative one for the Nation, but we must recognize that now, as we advance toward operational manned and unmanned space equipment, the costs chargeable directly to space programs are bound to become more visible. They are involved in the development of propulsion devices, electronic mechanisms, and space vehicle configurations going beyond the present state of the art. For the next couple of years, due to the long development time involved in the creation of totally new vehicles, the United States activities and experiments in space will be based largely on the use of Thor, Jupiter, Atlas, and Titan boosters. Whereas the Thor or Jupiter boosters, with upper stages, can launch upwards of 2,000 pounds of useful satellite payload into low orbit, the Atlas or Titan boosters, with upper stages, can launch upwards of 4,000 pounds.

Thor or Jupiter boosters, with upper stages already available, will be able to conduct deep space probes to the Moon and beyond to the near planets of Venus and Mars. They will further be capable of conducting exploratory satellite research and of developing systems for the recovery of satellites from orbit.

The Atlas or Titan boosters will be adequate for our initial national man-in-space program. The conduct of more elaborate sophisticated space applications for surveillance, early warning, communications, navigation, and meteorology will utilize payloads ranging up to 4,000 pounds.

A 4,000 pound capability will soon be insufficient for the overall military space objectives of the United States within our long-term national program. Therefore, to further our capability for putting greater weight into space, utilizing an Atlas or Titan-type vehicle as first stage, ARPA has initiated a program for development of a high energy, liquid fuel upper stage to achieve useful satellite payloads weighing up to 10,000 pounds. This capability will allow us to orbit such payloads at 300 miles orbital altitude.

It will allow us to place a space capsule, carrying a several man crew, into a satellite orbit for recovery after several days. It will further give us the means of orbiting satellites of 2,500 pounds weight at 22,000-mile altitudes. At this height, in an equatorial orbit, the satellite will revolve around the earth once in 24 hours, but in sequence with the earth's rotation, and will, therefore, appear to be stationary. This new propulsion system will also make it possible to land 1,000 pounds of instruments on the Moon intact or to land several hundred pounds of instruments on Venus or Mars intact.

ENGINE CLUSTER TO PROVIDE 1½ MILLION POUNDS OF THRUST

Within the next 3 years or so, we are going to find that we have progressed to the point where the Atlas or Titan is insufficient as the basic booster, because we shall be in a position to move into manned space platform and interplanetary flight development on the basis

of experiments previously conducted. So that we will not be limited by the lack of advanced propulsion systems when this time comes, the Advanced Research Projects Agency has ordered the clustering of existing ICBM-type engines to provide 1½ million pounds of thrust. We hope to have this booster available for flight test in 1960. A booster of such capacity, with an Atlas second stage and the high energy upper stage, could place a space platform of over 30,000 pounds into a long life orbit, or could launch a manned vehicle to circumnavigate the moon and return.

There is also under research and development by the National Aeronautics and Space Administration a 1½ million pound thrust, single-chambered engine. Planning for this engine began in the Department of Defense, and with ARPA approval, the Air Force let the early study contract for the booster in mid-1958. Shortly after assuming responsibility for the program, the National Aeronautics and Space Administration awarded a development contract under which the engine should be available to the United States for space purposes within the next 5 to 8 years.

Clustering of 4 of these 1½ million pound thrust engines will give an overall capability of 6 million pounds of thrust. If necessary to support national decisions, this immense propulsion system, with upper stages, will provide the means for establishing advanced heavy defense systems in space and for creating staging bases on the moon or other planets.

Of course, we recognize that propulsion is not our only problem. We must learn how to so guide and control a manned space vehicle that we can, with reasonable safety, propel it on a two-way trip to regions millions of miles from the launching point or for extended maneuvering throughout vast regions of outer space in protection of an earth which will be growing so small as to become militarily indefensible without such versatile vehicles.

This involves considerable empirical knowledge we do not now have. As a beginning, we must learn how to return a satellite from orbit. ARPA's Discoverer program, under which we will soon begin space vehicle launchings from the Pacific missile range, has as a primary purpose the recovery of a satellite from an orbit within an overall purpose of developing a number of systems and techniques to be employed in the operation of space vehicles. The initial launching primarily will be to test the vehicle itself, especially its propulsion and guidance. Later, the satellite will contain biomedical experiments to seek data on environmental conditions. This data will be useful to our national man-in-space program.

FIRST DISCOVERER VEHICLE WILL LAUNCH 1,300 POUND SATELLITES

The first Discoverer vehicle is a two-stage rocket. The main stage is a modified Thor and the second stage is a new rocket called the Bell-Hustler. This vehicle will launch satellites weighing approximately 1,300 pounds, including the weight of the second stage vehicle, which will orbit as an integral part of the satellite. This program is open ended; by this I mean that we may eventually introduce an Atlas and perhaps larger boosters with the intention of developing techniques applicable to more sophisticated operational space vehicles.

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To our way of thinking in ARPA, there is a vital step in sophistication which we must take without delay if we are to achieve an effective long-term program. This involves the development of vehicles which are not bound to an orbit or to a present trajectory, say to the moon and back, but rather can be maneuvered by a pilot in space and in the atmosphere. The Department of Defense is doing work in the field of developing advanced boost-glide systems which represent a step in the direction of manned maneuverable space vehicles.

During the coming fiscal year, ARPA intends to sponsor work leading to advanced manned maneuverable military space systems.

It is our firm intention to use the building blocks of our developing propulsion, recovery, and maneuver programs to build the foundation for the strong deterrent and defensive space posture upon which our national existence may well depend. I am certain you understand that we shall reach this posture only through military space programs of great versatility and reliability, programs which will insure that we will not be denied the opportunity to explore all of the potentialities of outer space.

While our program planning is logically aimed at the development of breakthrough technology necessary to the stationing of such defense forces in space as may be required, we are proceeding rapidly with shorter term defense applications derived from our new-found capabilities for orbiting objects in space. ARPA has initiated programs in the fields of communications satellites, navigation satellites, cloud cover satellites, and early-warning satellites. In addition. it has assumed management control over the Sentry project.

ARPA is vitally interested in the use of satellites as communications relay stations. Since, through high-flying satellites containing radio-relay equipment, broadcasts can be made from a single point to half the earth, we can obviously help the military with all of its communications problems; for logistics, for military control of equipment, men, aircraft, and eventually spacecraft.

SATELLITES OFFER ANSWER TO DEMANDS FOR INTERNATIONAL COMMUNICATIONS

Our communications satellite program will provide virtually needed expansion of intercontinental trunking capacity. Successful military operations require rapid, accurate, and secure communications. This is particularly true when the information transmitted involves a national emergency. Steadily mounting demands for intercontinental electrical communications are saturating existing networks and new channels and communications techniques must be developed. Satellites offer the most promising answer.

As you know, the Score project, initiated and directed by ARPA, gave the United States its first opportunity to use a satellite for communications relay. This is but the beginning of a program eventually leading, within the next 5 years, to the stationing of a communications satellite in a 24-hour orbit, 22,000 miles above the earth.

You will recall that when I discussed propulsion I noted that our Atlas, with a high-energy upper stage, will give us the capability to place a 2,000-pound satellite into a stationary orbit. With three or four such stationary communications satellites, we can accomplish

point-to-point communications all around the world for such vital applications as positive control of varied defense forces, including bombers, submarines, and spacecraft.

Our defense interests also dictate that we develop navigational systems employing satellites. Because vast areas of the world and its oceans are inadequately plotted geodetically, a more accurate, all-weather, space-based navigational system will be an essential component of worldwide military movements and operations of many types. In using satellites for navigation, we are really taking advantage of the satellite's similarity to the stars, which, as you know, have for a long time been important to navigation systems.

The important navigational difference, however, is that a satellite can be fitted out with a radio source which can be heard and detected by any ship, airplane, or other object on the surface of the earth, at any time of day or night and in good or bad weather. This will be of particular value to guidance of aircraft, surface ships, submarines, and spacecraft. Under our present program, we will begin satellite tests for this year and would hope to have initial systems in operation within the next 2 years.

Another of our space activities is the tactical cloud cover program. It is planned that this program will provide an answer to the present difficulties resulting from the lack of immediate weather information in inaccessible areas. Reliable weather information, especially cloud and surface wind conditions, is urgently needed. The satellite, by virtue of its ability to transmit rapidly over a large portion of the earth's surface, provides a potential answer to present difficulties resulting from lack of weather information.

Under the program planned by ARPA, the first launching will be attempted in 1959. Naturally such satellites have important applications to scientific as well as defense interests, and this program will be transferred to NASA on July 1, 1959.

SATELLITE WARNING AGAINST BALLISTIC MISSILES

With the decrease in warning time brought about by the intercontinental ballistic missile, the Advanced Research Projects Agency is devoting attention to development of an early-warning system, based on use of satellites under Project Midas or missile defense alarm system. Through this project, based primarily on infrared detection, we hope to develop greater insurance against surprise attack during the missile age in ways impractical under our present early-warning activities.

ARPA became responsible for the Sentry program in June of 1958. In order to provide timely military information vital to defense planning, an orbiting satellite system has important ramifications.

It should be evident that we are rapidly approaching a time when the space population will consist of many radiating as well as nonradiating satellites in orbit. This Nation must have the capability to track all types of satellites and space vehicles. Furthermore, the long-range space program depends upon an adequate tracking and data acquisitioning network. Without an adequate tracking environment, the orbiting of experimental military satellite systems is, for all practical purposes, meaningless.

It is realized that such a system could become very expensive and, therefore, careful coordination of the requirements of all potential users of such a network is required. During the past year, ARPA, with the assistance of the Jet Propulsion Laboratory, and since its foundation, NASA, has studied needs for worldwide space surveillance systems with a view to providing an overall program without unnecessary duplication. This work has recently culminated in a signed agreement between NASA and the Department of Defense for a general purpose national system.

In essence, the agreement provides for four additional tracking and data acquisition stations for deep-space probes and broad-band data readout to be located at separate overseas installations; two of these stations will be operated by NASA at the outset, and two by Defense. Exchange of common data is provided in the agreement. The agreement also provides facilities for man-in-space and Minitrack stations which NASA will operate but which will furnish data to Defense.

The need is recognized for two closely cooperative data reception and analyses centers; one operated, largely to meet scientific requirements, by NASA as a continuation and expansion of the Vanguard center and one operated, as a prototype to coordinate national defense surveillance requirements, by the Department of Defense. The latter is under Spacetrack management at the Cambridge Research Center. The two centers will exchange data freely and provide mutual support for the national program.

In addition, work on a satellite detection "fence" is being continued by DOD/ARPA. The purpose of this fence is to produce a capability for detecting, identifying, and predicting the orbits of nonradiating or "dark" objects in space. Construction is essentially complete on this experimental system, which involves both Minitrack and Doploc stations, extending generally across the southern part of the United States.

To provide backup for its many programs of vehicle, payload, and tracking development, ARPA is pursuing numerous programs for basic and exploratory military research involving auxiliary power systems, solid propellent technology, and other space-related fields.

I hope that this rundown of our ARPA space activities and planning testifies to the fact that there are no limits imposed on our military space program by lack of desire or imagination. We recognize that today's defense posture may be obsolete tomorrow. As we look to a future of increasing reliance upon military space technology, we realize that development of expensive space systems is required. Naturally, commonsense and close scrutiny must be applied to funding. Such commonsense and close scrutiny will dictate that these systems be developed on a continuing basis.

LONG-TERM PROGRAMING ESSENTIAL

Constant stops and starts do not yield necessary results; rather, we are left with frustration and downright extravagance. It is really up to all of us, and certainly up to you gentlemen, to see to it that we can continue our programs on a long-term basis and thus insure a maximum effort in the space program of the United States.

In this regard, I should like to note that our Department of Defense space activities, necessarily oriented as they are to national security objectives are a part of an overall national program in which the work of the National Aeronautics and Space Administration, in its area of responsibility, is correlated with that of ARPA, and in which both are interdependent and mutually supporting. I should like to assure you that the programs and plans I have outlined here today are consistent with the work to be done at NASA and that the two agencies are working very closely to insure that the requirements of both are adequately supported in the overall national space program.

To my mind, the cooperative effort which is underway between the scientific and military segments of our Government portends accelerating successes for the United States in outer space.

Senator JOHNSON. Proceed, counsel.

Mr. WEISL. Mr. Johnson, what is your position?

Mr. JOHNSON. I am Director of the Advanced Research Projects Agency of the Department of Defense.

Mr. WEISL. What are your duties and responsibilities?

Mr. JOHNSON. The charter assigned to ARPA involves the direction of projects in the field of space, military technology, ballistic missile defense, and solid propellent chemistry.

Mr. WEISL. What authority do you have?

Mr. JOHNSON. I have authority, complete authority, in a line capacity to discharge the duties and administer the funds as appropriated by Congress.

Mr. WEISL. Do you have charge of administering the funds?

Mr. JOHNSON. I do, sir.

Mr. WEISL. Please explain to the committee how that works?

ARPA DECIDES ON PROJECT, THEN TURNS IT OVER TO SERVICES

Mr. JOHNSON. The budgets are submitted in the usual procedure to the Secretary of Defense and are then submitted by the President to Congress as a part of the Defense Department budget. When the moneys are made available, we decide the projects that are to be funded and take over technical direction of these funds, generally transferring them to a military agency which we have designated, and which performs the task for us.

Mr. WEISL. You used the word "we."

Mr. JOHNSON. We——

Mr. WEISL. ARPA?

Mr. JOHNSON. My agency; yes, sir.

Mr. WEISL. And that means your agency.

Dr. York, what are your duties and responsibilities?

Dr. YORK. I am Director of Defense Research and Engineering. The directive from my office is still in the process of being prepared, but it will be cosistent with the legislation in the President's message which says that I am to be the principal adviser on technical matters to the Secretary of Defense, to supervise all research and engineering in the Department of Defense, and to direct and control such projects as may be deemed worthy of centralized control by our authority.

Mr. WEISL. Do you administer funds?

Dr. YORK. My position is primarily that of a staff officer, so that my job is to assist the Secretary of Defense in the administration of funds.

Mr. WEISL. Do you have a budget?

Dr. YORK. A small budget to cover certain studies and things of that sort.

Mr. WEISL. Who fixes the amount of the budget?

Dr. YORK. It is fixed in the usual way the Defense Department's budget is fixed.

Mr. WEISL. Who assigns the budget to you, in amount?

Dr. YORK. Well, the budget for my office is contained within the budget of the Office of Secretary of Defense. I mean, it is finally fixed by——

Mr. WEISL. My question was: Whether you have a separate budget?

Dr. YORK. There is a budget for the office; yes. But it is not a budget like the ARPA budget, it is not an operating budget of large size.

Mr. WEISL. Mr. Holaday——

Mr. HOLADAY. Yes, sir.

Mr. WEISL. What is your position, and what are your duties and responsibilities?

Mr. HOLADAY. At the present time I am Director of Guided Missiles, and also Chairman of the Civilian-Military Liaison Committee between NASA and the Department of Defense.

R. AND D. TRANSFERRED OUT OF MR. HOLADAY'S OFFICE

The responsibilities of this office are changing with the introduction, of course, of Dr. York into the organization, so that all the research and development and test activities are being put back into his office. So the directive that has been written for him will also modify the directive for the activities and responsibilities of the Director of Guided Missiles.

Mr. WEISL. The Defense Act was amended to streamline the organization of the Defense Department about 6 or 7 months ago. You have not received your directive yet, have you, Mr. Holaday?

Mr. HOLADAY. No, sir.

Mr. WEISL. You have not received your directive yet, Dr. York?

Dr. YORK. No, but it is a matter of days.

Mr. WEISL. And you have not received your directive, Mr. Johnson?

Mr. JOHNSON. I am operating under the same directive that I received on February 7 of last year. There is no change in it.

Mr. WEISL. The organization, however, has been changed in the meantime, has it not?

Mr. JOHNSON. Not so far as the Advanced Research Projects Agency is concerned.

Mr. WEISL. But research and development was under the Assistant Secretary of Defense in Charge of Research and Development before the act was amended.

Mr. JOHNSON. Well, the Advanced Research Projects Agency is a line agency, having funds as do the military services.

Mr. WEISL. Yes, but the Office of Assistant Defense Secretary in Charge of Research and Development was abolished, was it not?

Mr. JOHNSON. In effect, that is correct, sir.

Mr. WEISL. And you have taken over those duties?

Mr. JOHNSON. No, sir.

Mr. WEISL. Have you, Dr. York?

Dr. YORK. Yes.

Mr. WEISL. In that respect, Dr. York, do your duties and responsibilities differ from those of the Assistant Secretary of Defense in Charge of Research and Development?

Dr. YORK. The directive, when it is written, will be consistent with the Reorganization Act, giving me more authority than the Assistant Secretary of Defense for Research and Development had.

Mr. WEISL. But the act was amended 6 months ago, and you still have not gotten that directive?

Dr. YORK. Well I have been on the job less than 1 month.

Mr. WEISL. Mr. Johnson, in what respect do your duties and responsibilities differ from those of Dr. York and Mr. Holaday? You are all in the same field?

ARPA HAS SPACE TECHNOLOGY, BALLISTIC MISSILE DEFENSE, AND SOLID-PROPELLENT CHEMISTRY

Mr. JOHNSON. No, sir; I am sorry, I do not believe that is quite true.

The Secretary of Defense decided a year ago to establish a line agency, ARPA, to carry on certain very specific projects that he thought should be administered at the DOD level, and not by one of the three military services. He specifically assigned space technology, ballistic missile defense, and solid-propellent chemistry to ARPA. He did not want, as I understand it, to have three space programs in the DOD; he wanted one.

It is my understanding he still wants one. In order to accomplish this, he set this agency up.

We are certainly expected to be guided, in policy, by Dr. York.

Mr. WEISL. Well now, Mr. Johnson, you say he wanted one agency to administer space activities and ballistic missiles programs and research and development.

Mr. JOHNSON. Ballistic missiles defense.

Mr. WEISL. Ballistic missiles defense.

Mr. JOHNSON. And very advanced research; yes, sir.

Mr. WEISL. Now we have a ballistic missiles defense department in the Army, do we not?

Mr. JOHNSON. The NIKE-ZEUS has been assigned to the Army. A year ago we defended that project in the budget and did some work in the advance phases of it. But this was turned over to the Army.

Mr. WEISL. We have a ballistic missile defense agency and a satellite agency in the Air Force, do we not?

Mr. JOHNSON. You do not have a satellite agency; no, sir. I do not know whether there is a ballistic missile defense agency.

Mr. WEISL. Is the Air Force working on satellites?

Mr. JOHNSON. Under our direction; yes, sir. So is the Army and so is the Navy.

Mr. WEISL. What authority do you have over the Army and the Air Force?

Mr. JOHNSON. When I assign funds and a specific project for them to engage in from me, I direct that project.

Mr. WEISL. But they do have other funds besides those that you assign, do they not?

Mr. JOHNSON. Not in the field of space technology or in the basic advanced research and ballistic missile defense.

Mr. WEISL. Well now, let's get that straight. Does the Army have research funds for ballistic missile defense activities?

Mr. JOHNSON. Advanced research; no, sir.

Mr. WEISL. Any research?

Mr. JOHNSON. Not to my knowledge.

Mr. WEISL. Are you sure of that?

Dr. YORK. It depends on what you mean by advanced research and so on. The Army does have a program for development of Nike-Zeus and Nike-Zeus system.

Mr. JOHNSON. I am sorry, you did say the Army. I thought you said the Air Force. Yes, they do have a Nike-Zeus program which has been assigned to them by the Secretary of Defense.

Mr. WEISL. Are they working on other programs in that field?

Mr. JOHNSON. Not to my knowledge.

Mr. WEISL. Who is working, then, on the Nike-Hercules program?

Dr. YORK. That is not ballistic missile defense.

Mr. WEISL. What defense is that?

Dr. YORK. Air. Aircraft.

Senator JOHNSON. Who is working on that?

Dr. YORK. The Army.

Senator JOHNSON. Thank you.

NIKE-HERCULES PROGRAM DIRECTED BY DR. YORK

Mr. WEISL. Do you have anything to do with that, Dr. York?

Dr. YORK. Since it comes under the heading of "Research and Development Test and Evaluation," yes, it comes under my supervision.

Mr. WEISL. Do you have anything to do with that, Mr. Holaday?

Mr. HOLADAY. In the past, of course, this activity has been centralized in our office. Under the new setup the research and development and testing will go to Dr. York. That part dealing with the production and deployment of it will still probably stay with our office. The Nike-Zeus will remain in the Ballistic Missile Committee.

Mr. WEISL. Since the new amendments to the Defense Act were put in for the purpose of streamlining the organization, I wish one of you would explain to the committee here the demarcation between your duties in those fields?

Dr. YORK. Shall I try?

Mr. WEISL. Please do try.

Dr. YORK. The Advanced Research Projects Agency is a line agency, and as such it corresponds——

Mr. WEISL. Is a what?

Dr. YORK. A line agency.

Mr. WEISL. A line agency?

Dr. YORK. It is an operating agency for carrying out—for managing research and development programs. Its relationship to me, and to the rest of the Office of the Secretary of Defense, is the same as the relationship of one of the departments to the Office of the Secretary.

The program that ARPA sponsors and carries out is a research-development program and as such comes under the general supervision of my office.

SPECIAL COMMITTEE TO EXPEDITE BALLISTIC MISSILES PROGRAM

Mr. Holaday is in the process of change, as he has said himself. The research, development, and test and evaluation aspects of Mr. Holaday's job are passing into my office. There is, however, a special situation with ballistic missiles in the Defense Department. In response to the opinions of everyone in the executive and legislative branches, that the ballistic missiles should carry the highest priority, a special committee has been set up to streamline procedures which go beyond one staff office within the Office of the Secretary of Defense.

For example, I am, as I said, concerned with research, development, test, and evaluation, but in order to go from development into production, or procurement, it is necessary to coordinate with the Assistant Secretaries for Supply and Logistics, Properties and Installations, Comptroller, and so forth. One of the jobs that Mr. Holaday has carried on in the past, and the one he will continue to carry on, at least for some time, is that of Chairman of this Ballistic Missile Committee, as it is called, whose purpose is to expedite the coordination and the movement from development, which is in my office, on into procurement and production insofar as these relate to the Comptroller, Supply and Logistics, and so forth.

In other words, the existence of this committee is a special means for expediting these programs and handling them in a way in which a normal development program is not handled.

Mr. WEISL. Mr. Holaday is also the director of the guided missiles program?

Dr. YORK. This is what is in the process of being changed as my office comes into being.

Mr. WEISL. How long has this process of being changed been going on?

Dr. YORK. I have been here less than a month.

Mr. WEISL. Well you have been here longer, Mr. Holaday. How long has this process of being changed been going on?

Mr. HOLADAY. Well, it is only since the appointment of Dr. York that we have been able to move ahead with definite plans, as he has outlined it here. We are moving this work——

Dr. YORK. Sir, may I interrupt?

This program, as we believe, as we know everyone else believes, is one of the most important programs being carried on in the Department of Defense today. It is not one where we want to proceed willy-nilly or make hasty moves. It is one where we want to do what should be done, which is to transfer the research and engineering aspects to my office.

But we do not want to do it in any way which would interfere with the sense of urgency that this program has.

Mr. WEISL. I understand that, but because of the hearings before our committee it appeared that these processes were being overlapped and duplicated and done willy-nilly, and that is why 6 months ago the Congress amended the National Security Act—to streamline. Now,

6 months later, you tell me you are still in the process of trying to avoid this thing from being done willy-nilly.

Dr. YORK. I have just been here less than 1 month.

Mr. WEISL. Mr. Holaday has been here several years. I know Mr. Johnson has been here only approximately 6 or 7 months.

Do you agree with the definition of the lines of demarcation, which, I must confess, I do not quite thoroughly understand, Mr. Holaday?

HOLADAY HAS R. & D. UNTIL DR. YORK'S OFFICE IS ORGANIZED

Mr. HOLADAY. I think the trouble here, Counsel, is the confusion that exists in the fact that the new setup is not—we are not in a position to define it to you. Both Dr. York and myself are saying that we are not letting any balls drop through the cracks in the floor right now. I am going right ahead with the research and development until such time as Dr. York gets organized, and part of my staff will be transferred to his office and he will pick up that research and development and testing phases of the program.

Mr. WEISL. But Mr. Johnson is also going ahead with parts of that program, is he not?

Dr. YORK. Mr. Johnson is not in the missile program. Mr. Johnson is in——

Mr. WEISL. I thought Mr. Johnson was in the missile program.

Dr. YORK. Ballistic-missile defense, which is quite different.

Mr. WEISL. You are in the ballistic-missile defense.

What part of the satellite program are you in?

Dr. YORK. In charge completely of the military satellite program. But we are only involved in missiles to the degree we need them to put satellites in orbit. So we take them out of stockpiles of the missiles. We have nothing to do with their development or management or procurement.

Mr. WEISL. You are in charge of putting the satellites in orbit?

Dr. YORK. In charge of military space technology, which involves anything that goes into outer space.

Mr. WEISL. Well, does not the Army satellite program put the satellites in orbit now?

Dr. YORK. They have under——

Mr. WEISL. Doesn't the Air Force put satellites in orbit now?

Dr. YORK. Under the management of ARPA; yes.

Mr. WEISL. What part do you play in putting those satellites in orbit for the Army and the Air Force?

Mr. JOHNSON. We do the basic planning, determining what the total DOD program should be. And we have a staff of some 50 technicians who make recommendations for programs. I issue orders for work to be done to execute these programs. In many cases they are done by the military departments. In some cases, work is done by other agencies outside of the military.

Mr. WEISL. I do not want to labor the point, but does not Dr. von Braun's organization do the planning for putting Army satellites in orbit?

Mr. JOHNSON. Actually putting them into orbit; yes.

Mr. WEISL. Do they not do planning for the future for putting satellites in orbit?

Mr. JOHNSON. Under funds and under general management of ARPA.

Mr. WEISL. Well just what part do you play in that general management? These are all generalities that you have been talking about.

OPERATION OF ARPA SATELLITE PROGRAM

Mr. JOHNSON. We design a total Department of Defense program so that we have a posture of one program and not three. In other words, the Secretary of Defense wishes to have a total space program at the Department of Defense level.

And in many cases we assign the program to be done for us. For example, we have planned a communications satellite program in order to take advantage of new technology for better military communications. We have asked the Army Signal Corps to design a satellite payload. We have asked the Air Force to design the boosters to put the payload into orbit. We have asked the Navy to contribute to this program. In the case of Score, the Atlas that went into orbit on December 18, we asked the Signal Corps to design the satellite communications equipment, and the Air Force to provide the Atlas to put the communications payload into orbit.

And in many cases we bring the Navy into instrumentation design, into tracking, into many of the related phases of satellite work. This is the management function that we perform, using the best technical abilities wherever they exist, in the Department of Defense.

Mr. WEISL. Now, Dr. York, you do part of that same thing, don't you?

Dr. YORK. If it is a space program, ARPA is the operating agency for the space program that Mr. Johnson described. It comes under the general supervision of my office, but he does the work in the Department of Defense.

Mr. WEISL. I thought he was the fellow who does the planning, and not the operation, of the project?

Dr. YORK. I am using "operating" in the sense that an operating organization is one that has a line responsibility and a funding responsibility.

Mr. WEISL. Who determines, who has the responsibility and authority between you and Mr. Johnson?

Dr. YORK. Mr. Johnson reports to the Secretary of Defense the same as the Secretary of any service does. My relation with him is the same as it is to the services, or in the case of services, the research and development usually comes under the Assistant Secretary for Research and Development. My relationship with him is the same as it is with those people. They report to the Secretary of Defense. But I am the staff officer of the Secretary of Defense for Research and Development.

Mr. WEISL. Do you have authority over Mr. Johnson?

Dr. YORK. Within certain limits. As I said——

Mr. WEISL. Tell us what those limits are, where you have authority over Mr. Johnson?

Dr. YORK. The directive has not yet been written, as I said earlier.

Mr. WEISL. How can you operate when Mr. Johnson does not know whether he has the authority, and you do not know whether you have

the authority? And I suppose Mr. Holaday—you are in the same fix are you not, Mr. Holaday?

Dr. YORK. We obviously could not operate——

Mr. WEISL. I asked Mr. Holaday.

HOLADAY WILL "COORDINATE," ALSO WILL DEAL WITH PRODUCTION AND DEPLOYMENT

Mr. HOLADAY. Well, I believe my particular part of the program, sir, will be clean cut here, because I will not have any of the research and development. I will have a coordinating job and, primarily, the rest of it will deal with production and deployment problems. So that the research and development——

Mr. WEISL. Well, now, you talk about production and deployment problems. What part do you play in deployment problems of ballistic missiles?

Mr. HOLADAY. This is only a case, sir, of coordination.

Mr. WEISL. What do you coordinate? I may be awfully stupid, and I probably am, but I just cannot understand where the lines of demarcation are; who has the responsibility and authority for what, how you divide the authority among you. Because in our hearings, before we abolished the Office of Assistant Secretary of Defense for Research and Development, we recommended, or the act recommended, certain procedures to streamline the organization.

And from what you men have testified to, there is no evidence of any streamlining, but rather evidence of overlapping and duplication of effort.

Is that right?

Dr. YORK. May I?

We could not operate on an indefinite basis, without clear-cut directives, and we do not intend to and no one intends for us to. But we are just in the process of finishing up establishing these directives. But even without them all being assigned, printed, and distributed, and so on, we know what is basically intended by them. And I think that we do find it possible, the three of us and others, too, to be able to get along and know what each of us is supposed to do.

Mr. WEISL. I understand that, but the purpose of amending the law was not to leave it to the discretion of a lot of overelaborate agencies to find it possible to get together, but rather to eliminate these overlapping agencies so that there would be no problem of conflict.

Now, Mr. Johnson, you said that you have authority over future planning of military projects in the satellite field. Do you have anything to do with NASA?

Mr. JOHNSON. Yes, sir.

Mr. WEISL. The civilian end of the satellite field?

Mr. JOHNSON. We have nothing to do with the civilian end of the satellite or space work. We are completely interested in military technology. But of course we have a very close working relationship with NASA because much of the work they do in exploration, although scientifically oriented, will obviously apply to military follow-on programs.

Mr. WEISL. Both ARPA and NASA place orders directly with the field activity of the military department, do they not?

Mr. JOHNSON. That is correct, sir.

PRIORITIES ESTABLISHED BY SECRETARY OF DEFENSE UNDER DELEGATED AUTHORITY

Mr. WEISL. Who determines the relevant priorities and who settles the conflicts between them?

Mr. JOHNSON. Priorities all finally have to be established in the National Security Council. There is an office within the Department of Defense that does establish priorities for various programs. All the space programs now have very top priority, and at the moment there are no bottlenecks, there are no conflicts.

Mr. WEISL. I am not asking that. You say that priorities are determined by the National Security Council?

Mr. JOHNSON. I believe that is correct.

Mr. WEISL. Do you all agree on that?

Mr. JOHNSON. The National Security Council has delegated this to the Secretary of Defense, so the Secretary of Defense has this priority now.

Mr. WEISL. Well, have any conflicts arisen?

Mr. JOHNSON. There have been none to my knowledge.

Mr. WEISL. Now, Mr. Holaday, you are also head of the Civilian-Military Liaison Committee, created by the Space Act, are you not?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. How does that conflict with your duties as head of the Ballistic Missiles Division of the military?

Mr. HOLADAY. I do not believe it is a conflict, actually.

Mr. WEISL. Tell us how you operate, from the streamlining standpoint.

Mr. HOLADAY. Of course the work that we are doing on ballistic missiles is the making of the boosters for the space part of the program. This is partly responsive to the job of Chairman of the Civilian-Military Liaison Committee. Its function here, as far as the Liaison Committee is concerned, the act of drawing this up, was to see that there was cooperation and complete exchange of information.

This activity—what I have been doing under the chairmanship job here is to work on the techniques and procedures for exchange of information. Some of it has been work such as the problem we encountered here in adding to our space tracking capability. This comes right back and fits very closely to the work which we have in the Ballistic Missiles Committee, which also operates on ranges, coordinates the operation of ranges used in testing. So we have been working our space tracking together, to try to get to a national program.

Now we are far from a national program, but we are working in that direction.

Mr. WEISL. But Mr. Johnson said he has control of space tracking programs in the advanced research and development phase of it—did you not, Mr. Johnson?

ARPA AND NASA DO TRACKING AND HOLADAY COORDINATES IT

Mr. JOHNSON. The Advanced Research Projects Agency manages a very large portion of the total tracking system. NASA has the Vanguard tracking system and uses it independently. They feed the data into the Vanguard collection agency, and we feed our material into Space Track. There are two tracking agencies; yes.

Mr. WEISL. All of you are doing something about the tracking system, is that right?

Mr. JOHNSON. Mr. Holaday is referring to the fact that maximum coordination needs to take place here so that we do use these two tracking capabilities most economically.

Mr. WEISL. And do you, Dr. York—what do you do about these tracking programs?

Dr. YORK. I leave them to Mr. Johnson because they come under the heading of space, and Mr. Johnson has the operating responsibility for the Department of Defense in the space program.

Mr. WEISL. What about the military program in space, don't you have——

Dr. YORK. Mr. Johnson is in charge of the military space program.

Mr. WEISL. You are Director of Research and Development in what?

Dr. YORK. All research and engineering in the Department of Defense. It includes space, it includes ballistic missiles, it includes a great deal else.

Mr. WEISL. And your job includes space and ballistic missiles, does it not, Mr. Holaday?

Mr. HOLADAY. No; my job, now, in ballistic missiles activity is only with missiles, not with space.

Mr. WEISL. Your job was created under the Space Act, was it not?

Mr. HOLADAY. I am now talking about the old job I was in as Chairman——

Mr. WEISL. I am talking about the job you now hold as Chairman of the Civilian-Military Liaison Committee. Wasn't that created under the Space Act?

Mr. HOLADAY. That is one of exchange of information back and forth between the agencies.

Mr. WEISL. Whom are you paid by?

Mr. HOLADAY. Sir, I believe my pay comes from the Department of Defense. I am not sure of that. I am getting paid.

Mr. WEISL. May I ask you, Mr. Holaday, have you recommended certain projects to the Department of Defense?

Mr. HOLADAY. As Chairman of the Committee?

Mr. WEISL. As Director of Guided Missiles.

May I help you out?

Mr. HOLADAY. Yes, would you help me out?

HOLADAY BELIEVED POLARIS PACE COULD BE ACCELERATED

Mr. WEISL. Specifically, have you recommended a further acceleration of the Polaris program?

Mr. HOLADAY. There are technical discussions within the Department of Defense on which I am advised by the Secretary relative to this——

Mr. WEISL. Have you recommended certain accelerations of the Polaris program?

Mr. HOLADAY. The Secretary of Defense asked me whether technically I felt the program could proceed at a faster rate: I have advised that I thought it could technically proceed at a faster rate.

Mr. WEISL. Were those recommendations followed?

Mr. HOLADAY. Those recommendations were put in with other recommendations which the Secretary received.

Mr. WEISL. But were the recommendations that you made for the acceleration of the Polaris program followed?

Mr. HOLADAY. Incidentally, I said that my recommendation was that it could be accelerated——

Mr. WEISL. I know that, but was it followed?

Mr. HOLADAY. To a degree; yes, it has been followed.

Mr. WEISL. To what degree was it not followed?

Mr. HOLADAY. Well, I was not asked how fast could it go, I was asked could it go faster.

Mr. WEISL. You said it could. Now, how did you say it could go faster?

Mr. HOLADAY. Because of the fact that the research and development work was proceeding at a rate which I thought we could probably move ahead faster with the program. And some of this has been added in at the present time.

Mr. WEISL. Were those recommendations that you made, to have the research and development program of Polaris move faster, followed? Please tell the committee whether they were followed or not?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Were they followed in whole or in part?

Mr. HOLADAY. I believe almost in whole, sir.

Mr. WEISL. Well, almost. How much was left out?

Mr. HOLADAY. Well, that would be very difficult for me to answer, in detail.

Mr. WEISL. You know what you recommended?

Mr. HOLADAY. The recommendation had to deal both with the missiles and with the submarines, with the work that overall is in connection with it. We have added more money to the research and development program.

Mr. WEISL. What part of it that you recommended was not followed?

Mr. HOLADAY. I do not recall any of the detail that has not been followed.

Mr. WEISL. Then all of the recommendations, you state under oath, that you made, have been followed?

Mr. HOLADAY. The recommendation, sir, was not at any particular rate. I was asked the question, "Could it be accelerated?" I was never asked, how fast would I recommend it to be accelerated.

Mr. WEISL. You certainly did not say it could be accelerated faster without knowing what you were talking about, did you, Mr. Holaday?

Mr. HOLADAY. No.

Mr. WEISL. What were you talking about?

Mr. HOLADAY. I was talking about the rate of getting on with the job of research and development and proceeding at a rapid rate, at a more rapid rate.

HOLADAY CITED DETAILS OF HIS RECOMMENDATION

Mr. WEISL. Can't you tell us specifically what you recommended to make the program accelerate at a more rapid rate? You are the Director of Guided Missiles.

Mr. HOLADAY. The recommendation at that time, sir, was to add a tender, which was part of our effort. It was also to add more money into the program for a different approach, for some different approaches, to the method in which the missile was going to be used. The recommendation also was adding the submarines, which are in the President's budget which was submitted this year, and also——

Mr. WEISL. Which was what, omitted?

Mr. HOLADAY. Which was in the President's budget submitted this year.

Mr. WEISL. Oh, submitted?

Mr. HOLADAY. That is right. And also, that we recommended the inclusion of long leadtime items for additional submarines to be put into the program.

Mr. WEISL. Well, let me put it another way. You were talking about achieving an earlier operational capability of the Polaris, is that right?

Mr. HOLADAY. One of the things here in this extra research and development effort was to insure that we could meet our early operational date.

Mr. WEISL. Tell us what recommendations you made that were not followed?

Mr. HOLADAY. I have none.

Mr. WEISL. They were all followed?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Were there any other recommendations in connection with the missile program that you made?

Mr. HOLADAY. Not as to an accelerated program.

Mr. WEISL. Well as to any programs?

Mr. HOLADAY. Well, we have had recommendations for studies.

Mr. WEISL. I am talking about you as Director of Guided Missiles, what recommendation did you make?

Mr. HOLADAY. Well, the question here that I am answering is the fact that we have made recommendations for studies on the question of moving ahead faster on programs. These usually go to the services, and they report back to——

Mr. WEISL. Were any recommendations that you made to make the program go faster not followed?

Mr. HOLADAY. No, sir.

Mr. WEISL. They were all followed?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Dr. York, did you make any recommendations concerning your programs?

Dr. YORK. Not in the 3½ or so weeks I have been there—no recommendations concerning programs.

Mr. WEISL. How long have you been with the Defense Department?

Dr. YORK. I was in ARPA for 9½ minths.

Mr. WEISL. During the time you were in ARPA, and the short time that you have been in this new job as Director of Research and Development, have you made any recommendations for the acceleration of research and development in the missile or satellite program?

Dr. YORK. Well, I was Chief Scientist with Mr. Johnson for ARPA in those 9½ months, and as such I participated with him, and the rest of the people in ARPA, in outlining the ARPA program.

That included a great deal of acceleration. The first year we were there we had some amount of money that was in the few tens of millions and, the second year we were there we had an amount of money in the range of $400 million. Whether you want to call that recommending acceleration, which was——

Mr. WEISL. No, I do not want to take up the time of the committee on generalities. Were any recommendations that you made to accelerate the research and development in the missile and satellite field rejected or not followed?

Dr. YORK. Well, we were not in the missile field.

Mr. WEISL. What field were you in?

Dr. YORK. Space and antimissiles.

Mr. WEISL. Well, in the space and antimissile field?

Dr. YORK. Well, it was not a simple matter of just making a recommendation. We worked out with everyone involved the development of the program. In that case ARPA is not an adviser, ARPA is an operating agency. And we developed a program, and ARPA is carrying it out.

DR. YORK SAYS HE RECOMMENDED MAN-IN-SPACE PROGRAM

Mr. WEISL. Did you make any recommendations that were not followed?

Dr. YORK. I am sure I must have made some. I mean, any person in research and development is coming forth with recommendations.

Mr. WEISL. Do you remember any recommendations which you made that were not followed?

Dr. YORK. I do not know of any that were not followed, at least in some modified form.

For example, I recommended to Mr. Johnson that ARPA should do a man-in-space program. ARPA started to get such a program underway. It was then subsequently decided, after the civil agency was established by Congress last year, that this program should be carried out by the civil agency, which is a perfectly plausible decision. It happens to be something I recommended the military do that it is not doing, but the Nation is doing it even so.

Mr. WEISL. I am talking about things that you recommended that no one is doing.

Dr. YORK. I do not know of anything substantive. I mean, there are matters of detail, like which booster should be used for which. In some cases other people did not agree with my recommendations. But it is not anything substantive that interferes with the program.

Mr. WEISL. But the acceleration of the program, on which the Defense Department has laid such great stress, especially as to speed and its meeting of dates, those are the recommendations that were——

Dr. YORK. During the time I was in ARPA the Space Department program was accelerated from——

Mr. JOHNSON. Nothing.

Dr. YORK. Almost nothing to what it is today. That is a lot of acceleration.

Mr. WEISL. Well, then, there was a lot of acceleration, and no recommendations that you made as to that acceleration were rejected?

Dr. YORK. The whole thing was a recommendation for acceleration. I am sure that there must be details of things that were left out, but I do not think anything substantive.

Mr. WEISL. I see.

Mr. Holaday, Congress provided funds for four additional Polaris submarines. The Secretary of Defense released funds for only one of those submarines. Did you recommend release of any more funds for any more submarines?

Mr. HOLADAY. Mr. Chairman, we have been holding council here, and I do want to correct my statement. I think I have a letter here which I will have to read, which is a slightly different recommendation from what I said. If we can find it here, I will get it out so I can read it to you.

Mr. WEISL. I wish you would read it.

Mr. HOLADAY. I think it will correct that statement.

Mr. WEISL. While you are looking for that, I will ask you, Mr. Johnson, do you have a budget?

Mr. JOHNSON. Yes, sir.

Mr. WEISL. Did you recommend a higher budget than you got?

Mr. JOHNSON. For fiscal 1960?

Mr. WEISL. Yes, sir.

Mr. JOHNSON. Yes, sir.

MR. JOHNSON'S RECOMMENDATION CUT 30 PERCENT IN BUDGET

Mr. WEISL. How high a budget did you recommend, or what was the total amount of the budget that you recommended?

Mr. JOHNSON. The amount I recommended was about 30 percent more than was approved.

Mr. WEISL. Did you believe sincerely that was the minimum budget in the interest of national defense that you needed?

Mr. JOHNSON. Certainly I did; yes, sir.

Mr. WEISL. What justification was there for cutting that budget by 30 percent?

Mr. JOHNSON. The total budget process within the policy established by the executive branch does make possible the cutting, at the discretion of the Secretary of Defense, of those things which he thinks could be cut. And I received my share of cuts. Our program, therefore, had to be readjusted to meet the sum that was approved. The effect of the cut is difficult to determine now.

Mr. WEISL. Has that cut of 30 percent impaired your ability to accelerate your program in this critical field?

Mr. JOHNSON. At this moment I think that we could buy a little more time with more money. But 30 percent more would not necessarily buy us 30 percent more time. It would buy us a little more time, but I doubt whether it would be too significant.

Mr. WEISL. Well, if it is not too significant, why did you ask for 30 percent more?

Mr. JOHNSON. Well, I think you always do a better managing job when you have sufficient funds available to expedite or supplement programs.

Mr. WEISL. Yes, but you know in the interest of economy you do not ask for 30 percent more than you got when the 30 percent would only give you an insignificant addition to your duties?

Mr. JOHNSON. Well, I think you put it another way. There are certain parts of your program that can be delayed, because of priorities and so you can cut the things that can be best delayed. Succeeding appropriations may enable you to catch up with any time that you have lost.

Mr. WEISL. You are familiar, Mr. Johnson, with the testimony that has taken place here; are you not? If you are not I will try to summarize briefly.

The testimony taken here was that certain missiles, such as the Regulus and Snark and others, were cut out because dates were advanced for the capability of more sophisticated missiles.

Now in your department do you think that a 30-percent cut would delay the delivering of those missiles in quantity and in capability?

Mr. JOHNSON. Well again, sir, I am not involved in missiles.

Mr. WEISL. You are involved in research, are you not?

Mr. JOHNSON. Yes; in the areas that I have been assigned.

Mr. WEISL. Isn't research the way that we get the new generation and more sophisticated missiles in the future?

Mr. JOHNSON. Oh, yes; certainly.

Mr. WEISL. And isn't the data on which we get those missiles most important to create the defense retaliatory capacity that the Nation has against attack?

Mr. JOHNSON. I am sorry, sir, but I am not familiar enough with the missile program to be able to answer that question.

Mr. WEISL. You are familiar with the satellite program?

Mr. JOHNSON. I can speak for the satellite program; yes, sir.

Mr. WEISL. Is the satellite program considered a critical program?

Mr. JOHNSON. Yes.

Mr. WEISL. Did not you ask for 30 percent more than you got because with that 30 percent you could make some significant acceleration with the satellite program?

Mr. JOHNSON. That is correct, sir.

CUT DOES NOT SIGNIFICANTLY AFFECT PROGRAM FOR FISCAL YEAR 1960

Mr. WEISL. Why do you say the 30 percent cut did not significantly affect your program?

Mr. JOHNSON. By reprograming we are not going to lose time in 1960. We might lose time in 1961, 1962, or 1963.

Mr. WEISL. But you are concerned with mass research, aren't you?

Mr. JOHNSON. Yes, but we are talking now about research in 1960.

Mr. WEISL. But, Mr. Johnson, as Director of ARPA, what you do in a given year affects the time at which you get your future development; doesn't it? In other words, if you lose time this year, you put back the time at which you get your development program in the future?

Mr. JOHNSON. What I am trying to say, sir, is a cut of 30 percent does not necessarily lose 30 percent time in 1960. If the cut were restored in 1961 or subsequent years you could make up a delay. Research is long range.

Mr. WEISL. In other words, you think that 30 percent cut was just a deferment, that you are going to get that 30 percent——

Mr. JOHNSON. I am certainly hoping that it was.

Mr. WEISL. Now, Mr. Holaday, have you that letter?

Mr. HOLADAY. Sir, we do not have a copy of the letter with us, but are going to call over to find out where the copy is.

But working from a chart which I have in front of me, I can cover part of it and I think we will have to put the letter into the record.

But our recommendation—it was asked of us, could we technically recommend faster moving ahead with the Polaris. We recommended that two submarines be released on the 1st of January, and this be followed by four submarines to be in the 1960 budget.

Mr. WEISL. That was a significant recommendation, wasn't it?

Mr. HOLADAY. This was our statement as to the technical capability of how fast we could go along.

Mr. WEISL. And what happened to that recommendation?

NO CONCURRENCE IN RECOMMENDATION FOR ACCELERATION

Mr. HOLADAY. This recommendation, sir—in balance with the Secretary of Defense and with the JCS, they did not concur to go as fast with the program.

Mr. WEISL. That was a significant rejection, wasn't it, of a material recommendation?

Mr. HOLADAY. My recommendation was based on technically how fast could we move with the program.

Mr. WEISL. When you get the letter you will have some other recommendations, material recommendations I am talking about——

Mr. HOLADAY. This is covering this particular part which I am reading here from a chart. We are trying to get a copy of the letter here right away.

Mr. WEISL. Mr. Johnson, would you please tell the committee what the Pacific missile range is—or do you know that, Dr. York?

Dr. YORK. The Pacific missile range is a range on the Pacific Coast in California which has some analogies to the Atlantic missile range, which is the range at Cape Canaveral. The Pacific missile range is under the direction of the Navy as the Atlantic missile range is under the direction of the Air Force. That is, it is operated by the Navy, and the one in the Atlantic by the Air Force. It is used for testing missiles. It will be used for launching satellites.

Mr. WEISL. Now who provides the budget for that range?

Dr. YORK. The Department of the Navy.

Mr. WEISL. And that budget runs into very large sums, does it not?

Dr. YORK. Yes.

Mr. WEISL. And who has control over that range?

Dr. YORK. It is managed by the Department of the Navy.

Mr. WEISL. Has NASA anything to do with that range?

Dr. YORK. NASA will no doubt use the range.

Mr. WEISL. Who determines who uses the range when and who gets priorities?

Dr. YORK. The requirements are usually submitted sufficiently far in advance so the priority situation does not arise.

Now we should turn to Mr. Holaday because his position, as the liaison committee between NASA and the Department of Defense, is where the things would be ironed out.

Mr. WEISL. Well now, Mr. Holaday, you tell us the problems in that Pacific missile range?

Mr. HOLADAY. The Pacific missile range was put in primarily—it has two sections to it. That is doing the R. & D. testing for the Navy close in to California there. A lot of this is in air-to-air testing. It is also a training range for the Air Force, for the launching of Thors and Jupiters as of the present time. This is a range for their testing work only in connection with training.

Now the operation of this range is quite large. What we are working on, as far as chairman——

Mr. WEISL. Excuse me. Tell us what NASA's participation in that range is.

Mr. HOLADAY. Well, this is the part I was just trying to lead up to.

Mr. WEISL. I am sorry.

Mr. HOLADAY. As chairman of the liaison committee, we have taken up this problem of putting in material for tracking the satellites. These will be put in in some cases both in the Atlantic range and in the Pacific range. We are coming up, studying the problems, of getting this all working together as a unit so that we do not duplicate and get the best operation that we possibly can get. This is under study at the present time.

Now NASA will conduct tests in which equipment will be put in—Mr. Johnson has recommended some tests and equipment—we will jointly use these facilities in doing this research development testing.

Mr. WEISL. Who makes the decision as to the disposition of the recommendations that are made by Mr. Johnson and Dr. Glennan or by Dr. York—if you have anything to do with it?

NASA AND ARPA REACHED AGREEMENT ON SATELLITE TRACKING

Mr. HOLADAY. Sir, these gentlemen got together. We brought them together, I guess through the chairman of the liaison committee, and they have reached an agreement on the installation of certain tracking equipment. And this is proceeding now with part of it being financed by ARPA, part of it being financed by NASA, and it will be jointly used for their parts in the program.

Mr. WEISL. Do you care to tell the committee of any problems that have arisen, or that in your opinion might arise, and any suggestions you have to facilitate the efficient operation of that range?

Mr. HOLADAY. Well, we had a problem, sure, getting this equipment in, and trying to put it in the best locations, where we could get by with the minimum amount of equipment and still do our research and development program. By jointly working together in a technical group, and then by final agreement between Mr. Johnson and the Administrator of NASA, this problem has been resolved and we are proceeding with the installation of the equipment. I do not see any particular problem. It has worked out very excellently, sir.

Mr. WEISL. Thank you.

Mr. Johnson, do you make technical decisions?

Mr. JOHNSON. Yes, sir.

Mr. WEISL. Do those technical decisions overlap decisions that are made by General Schriever, for instance?

Mr. JOHNSON. The decisions that I make are overriding because we are in charge of the project.

Mr. WEISL. In other words, you can override General Schriever, who is in charge of the ballistic missiles program for the Air Force?

Mr. JOHNSON. On space technology programs that I ask General Schriever to do for me I am the boss.

Mr. WEISL. And you can override the Chief of the Air Force, is that right?

Mr. JOHNSON. It is my program, yes, sir.

Mr. WEISL. Suppose the Chief of the Air Force gives his subordinate General Schriever certain decisions on technical matters. Can you override him?

Mr. JOHNSON. I control the money.

Mr. WEISL. Do you want this committee to believe that you could take away money from the ballistic missiles program for the Atlas——

Dr. YORK. Mr. Johnson said space program.

Mr. JOHNSON. Sir, I am talking only about the programs for which I am responsible.

Mr. WEISL. You are talking about space?

Mr. JOHNSON. Yes, space. The programs I am authorized—the money given to me by Congress to administer.

Mr. WEISL. What part of the satellite program does the Air Force have?

Mr. JOHNSON. That part I assign to them.

Mr. WEISL. You are the sole judge of that?

Mr. JOHNSON. That is right.

Mr. WEISL. What part do you have in that, Dr. York?

FINAL AUTHORITY ON ALL R. & D. IS DR. YORK

Dr. YORK. In the future the supervision of all research and engineering in the Department of Defense will come in my office. That includes the overall supervision of the space program, missile program, and so on. That is in the function of——

Mr. WEISL. Just a minute. You will be able to override Mr. Johnson, won't you?

Dr. YORK. In principle on research and engineering items, yes.

Mr. WEISL. In other words, Mr. Johnson can override the head of the Air Force, and you can override Mr. Johnson?

Dr. YORK. Mr. Johnson can override the people who are working for him on space programs, whether it is the head of the Air Force——

Mr. WEISL. The head of the Air Force does not work for him on space, does he?

Dr. YORK. Pardon?

Mr. WEISL. The head of the Air Force does not work for Mr. Johnson on space?

Dr. YORK. No.

Mr. WEISL. He said he can override him.

Dr. YORK. He was talking about General Schriever.

Mr. JOHNSON. Wait a minute. I can override the Secretary, too.

Mr. WEISL. You can override the Secretary of Defense?

Mr. JOHNSON. On the programs that I control, I can override anyone.

Mr. WEISL. You can override the Secretary of Defense?

Mr. JOHNSON. I am sorry; no, not the Secretary of Defense.

Mr. WEISL. Well now, you cannot override Mr. Johnson on that, then, can you, Dr. York?

Dr. YORK. I am the principal assistant to the Secretary of Defense on all research and development, which includes——

Mr. WEISL. Can you override Mr. Johnson?

Dr. YORK. I think so, in a case—— [laughter]. There is nothing unusual about having a line of people in authority.

Mr. WEISL. I am not in the military business but——

Dr. YORK. In industry either.

Mr. WEISL. But it would be very unusual in industry.

Dr. YORK. It would not be unusual in industry.

Mr. WEISL. But you have not any directive yet?

Dr. YORK. No, sir.

Mr. WEISL. Then you do not know yet whom you can override?

THE DIRECTIVE WILL OBEY THE LEGISLATION

Dr. YORK. I have reason to believe what the directive will say, and it will say that sort of thing. Because that is what the legislation says.

Mr. JOHNSON. Counselor, may I interject something here?

Mr. WEISL. Yes, certainly.

Mr. JOHNSON. You have referred to industry.

Mr. WEISL. Let's not get into industry. We have a limited time here.

Mr. JOHNSON. But I spent a lifetime in industry, and I want to say that I have gotten more done in 11 months in the Department of Defense, with less interference, than I ever did in industry.

Mr. WEISL. Of course, I do not know how much you did in industry. [Laughter.]

Mr. Holaday, do you care to give us some more of those recommendations that were significant that were rejected?

Mr. HOLADAY. Sir, I find myself in somewhat of an awkward position. I do not have the letter. The letter is classified and I would ask if I could submit it in an executive session.

Senator JOHNSON. Without objection that request will be granted.

Mr. HOLADAY. Thank you. I will get a copy of the letter over here right away.

(The letter refered to is classified and has been retained for the committee files.)

Mr. WEISL. I think I have exceeded my time, Mr. Chairman.

Senator JOHNSON. Mr. Johnson, under the recent reorganization, do you still report directly to the Secretary of Defense or do you report to Dr. York?

Mr. JOHNSON. I report to the Secretary of Defense, sir.

Senator JOHNSON. Do you report to Dr. York on anything, research and engineering?

Mr. JOHNSON. No, sir.

Senator JOHNSON. I understood you to say that the Advanced Research Projects Agency was a line agency and operates; is that correct?

Mr. JOHNSON. That is right, sir.

ARPA'S RELATION TO DEPARTMENT OF DEFENSE COMPARABLE TO SERVICES, BUT ENGAGES IN RESEARCH ONLY

Senator JOHNSON. I thought the military services were the operating agencies under the policy guidance and control of the Secretary of Defense.

Does that mean ARPA is now a fourth department?

Mr. JOHNSON. Sir, to the degree that we engage in research, we are comparable, but of course the military departments do much more than just research.

Senator JOHNSON. Would you elaborate some on the relation between the Office of the Director of Research and Engineering and ARPA?

Mr. JOHNSON. I believe——

Senator JOHNSON. In other words, can Dr. York give you any order?

Mr. JOHNSON. Dr. York, as we understand his job, is to exercise general supervision over the board programing, and I definitely would defer to his judgment on programs which he recommends against. But once a program has been decided upon, then I think I am free to execute that program without day-to-day regulation by Dr. York.

Senator JOHNSON. Are you satisfied with the rate of progress that you are making in the program?

Mr. JOHNSON. Sir, I think that we have made wonderful progress. I was appointed on February 7. I came full time on the job April 1, and I believe we really got the country into space in a very, very big hurry, and I take great pride in the fact that, with a small technical group without a laboratory, we were able to get organized as fast as we did and to take up the job with a full head of steam.

Senator JOHNSON. Dr. York, as soon as your directive has been issued, will you please send the committee a copy of it so we can incorporate it in the record?

Dr. YORK. Certainly.

Senator JOHNSON. Do you anticipate it will be issued shortly?

Dr. YORK. Yes, sir.

(The directive referred to is as follows:)

February 10, 1959
Number 5129.1
Adm Asst., S/D

DEPARTMENT OF DEFENSE DIRECTIVE

Subject: Director of Defense Research and Engineering.

I. GENERAL

Pursuant to the authority vested in the Secretary of Defense and the provisions of the National Security Act of 1947, as amended, including the Department of Defense Reorganization Act of 1958, the Director of Defense Research and Engineering shall have responsibilities, functions and authorities as prescribed herein.

II. RESPONSIBILITIES

The Director of Defense Research and Engineering is the principal adviser and staff assistant to the Secretary of Defense in the following functional fields:

1. **Scientific and technical matters.**
2. **Basic and applied research.**

3. Research, development, test and evaluation of weapons, weapons systems and Defense materiel.

4. Design and engineering for suitability, producibility, reliability, maintainability, and materials conservation.

III. FUNCTIONS

Under the direction, authority and control of the Secretary of Defense, the Director of Defense Research and Engineering shall supervise all research and engineering activities in the Department of Defense and shall perform the following functions in his assigned fields of responsibility—

1. Recommend policies and guidance governing Department of Defense planning and program development.

2. Plan and recommend an optitmum integrated program of research and development to meet the requirements of national military objectives and initiate projects to fill important gaps which may exist.

3. Review projects, programs, and objectives of programs of the military departments and other Department of Defense research and development agencies.

4. Develop systems and standards for the administration and management of approved plans and programs.

5. Evaluate the administration and management of approved policies, programs and projects.

6. Recommend the assignment or reassignment of research and engineering responsibility for the development of new weapons or weapons systems, giving due consideration to the departmental functions set forth in DOD Directive 5100.1.

7. Direct and control (including their assignment or reassignment) research and engineering activities that the Secretary of Defense deems to require centralized management.

8. As approved by proper authority, engage in or designate appropriate research and development facilities to engage in basic and applied research projects essential to the responsibilities of the Department of Defense which pertain to weapons systems and other military requirements: (1) by contract with private business entities, educational or research institutions, or other agencies of government, (2) through one or more of the military departments, or (3) by utilizing employees and consultants of the Department of Defense.

9. Recommend appropriate steps (including the transfer, reassignment, abolition, and consolidation of functions) which will provide in the Department of Defense for more effective, efficient, and economical administration and operation, will eliminate unnecessary duplication, or will contribute to improved military preparedness.

10. Recommend to the Secretary of Defense appropriate funding for research, development, test and evaluation, including allocations from the Emergency Fund, Department of Defense.

11. Keep the Department of Defense informed on significant trends in scientific research relating to national security and recommend measures to assure continuing progress.

12. Exercise administrative direction of the Weapons Systems Evaluation Group and assure its responsiveness to the needs of the Joint Chiefs of Staff and the Office of the Secretary of Defense for operations analysis.

13. In coordination with the Assistant Secretary of Defense (International Security Affairs), engage in programs for assistance to friendly countries in military research and development and in the interchange of related scientific and technical information.

14. Such other duties as the Secretary of Defense assigns.

IV. RELATIONSHIPS

A. In the performance of his functions, the Director of Defense Research and Engineering shall—

1. Coordinate actions as appropriate, with the military departments and other Department of Defense agencies having collateral or related functions in the field of his assigned responsibility.

2. Maintain active liaison for the exchange of information and advice with the military departments and other Department of Defense agencies.

3. Consult with the Joint Chiefs of Staff on the interaction of research and development and strategy.

4. Seek formal statements of military operational requirements from the military departments or the Joint Chiefs of Staff, as appropriate, for research and development projects and equipment areas which appear to require such statements.

5. Maintain or arrange for the maintenance of active liaison with appropriate research and development agencies outside the Department of Defense, including private business entities, educational or research institutions or other agencies of government.

6. Make full use of established facilities in the Office of the Secretary of Defense, military departments and other Department of Defense agencies rather than unnecessarily duplicating such facilities.

B. The Secretaries of the military departments, their civilian assistants, and the military personnel in such departments shall fully cooperate with the Director of Defense Research and Engineering and his staff in a continuous effort to achieve efficient administration of the Department of Defense and to carry out effectively the direction, authority and control of the Secretary of Defense.

V. AUTHORITIES

A. The Director of Defense Research and Engineering, in the course of exercising full staff functions in his assigned fields, including those enumerated in Section III above, is hereby specifically delegated authority to:

1. Issue instructions and one-time directive-type memoranda, in writing, appropriate to carry out policies approved by the Secretary of Defense for his assigned fields of responsibilities in accordance with DOD Directive 5025.1. Such instructions and memoranda to the military departments will be issued through the Secretaries of those departments or their designees.

2. Approve, modify or disapprove programs and projects of the military departments and other Department of Defense agencies in his assigned fields to eliminate unpromising or unnecessarily duplicative programs, and initiate or support promising ones for research and development.

3. Obtain such reports and information (in accordance with provisions of DOD Directives 7700.1 and 5158.1) and assistance from the military departments and other Department of Defense agencies as may be necessary to the performance of his assigned functions.

B. Other authorities specifically delegated by the Secretary of Defense to the Director of Defense Research and Engineering in other directives will be referenced in an inclosure to this directive.

VI. ABOLITION AND TRANSFER

A. The position of Assistant Secretary of Defense (Research and Engineering) is hereby abolished and all personnel, functions (including the administrative direction of the Weapons System Evaluation Group) and records of the Office of the Assistant Secretary of Defense (Research and Engineering) are transferred to the Office of the Director of Defense Research and Engineering as of the effective date of this directive.

B. All directives, instructions, memoranda, delegations of authority or other issuance not canceled by this directive containing the title of Assistant Secretary of Defense (Research and Engineering) are hereby changed to Director of Defense Research and Engineering.

VII. CANCELLATION

DOD Directive 5129.1 dated March 18, 1957 is hereby canceled.

VIII. EFFECTIVE DATE

This directive is effective upon publication.

NEIL MCELROY,
Secretary of Defense.

[Enclosure]

References to other authorities specifically delegated by the Secretary of Defense to the Director of Defense Research and Engineering in other directives

1. Authority to act for the Secretary of Defense in matters pursuant to Executive Order 9913 pertaining to the termination of OSRD as contained in DOD Directive 5128.6 dated 9 August 1954.

Senator JOHNSON. Dr. York, does your supervision over research and development enable you to direct the Army, Navy, and Air Force to initiate or cancel any particular project?

Dr. YORK. This, of course, is a question of precisely what does the directive say, but the authority to do so will be there, I presume.

However, I do not intend to operate in a fashion that makes use of this kind of club. I regard myself as primarily in a staff officer position to the Secretary of Defense with, as a result of the legislation, somewhat more authority than the usual staff officer has.

DIRECTIVE WILL GIVE DR. YORK AUTHORITY OVER SERVICES

Senator JOHNSON. But you anticipate when you do have the directive that you will have the authority to do that, whether you exercise the authority or not?

Dr. YORK. Yes, authority to approve, modify, or disapprove programs and projects is possibly what it will say.

Senator JOHNSON. Exactly what additional authority will you have that the Assistant Secretary of Defense for Research and Engineering will not have?

Dr. YORK. He had the power only to recommend such approval, modification, or disapproval. Furthermore, I also have the authority to direct and control such research as may be approved for centralized direction and control by higher authority, the President and the Secretary of Defense.

Those are the biggest differences.

Senator JOHNSON. Are you generally satisfied with the progress of your work in the 10 months you have been there?

Dr. YORK. Yes, sir.

Of course, that was in two fairly different positions, and as for my recent position, I do not have anything to really report on. But I hope the thing——

Senator JOHNSON. I am not asking you to boast about anything. I am just asking for your evaluation as far as this country is concerned in the fields that you operate.

Dr. YORK. For the period when I was in ARPA, yes; I am satisfied with what we did there.

Senator JOHNSON. You know about the old story, "Who's on first base?" Now I want to ask you this question.

Who is the "chief cook" in the space kitchen?

Dr. YORK. Are you referring to the Department of Defense?

Senator JOHNSON. I am referring to the whole space picture. You have the National Space Agency, and then you have three departments in the Department of Defense, and you have supervisor on top of supervisor. I just want to get a picture here as nearly as I can in order to understand this whole space picture.

Dr. YORK. I can start from either end. From the top down, there is the National Space Council, which was set up by act of Congress, and then there are the two operating groups: ARPA in the Department of Defense, and the NASA, the Civilian Space Agency.

Senator JOHNSON. Really, the President, then, is the head of the Civilian Space Agency?

Dr. YORK. No, sir; he is head of both space agencies; that is, the National Space Council, the National Aeronautics and Space Council, is in charge of everything for the executive branch.

Senator JOHNSON. I wasn't limiting what he was head of, but he is head of that.

Dr. YORK. Yes, sir. I am sure you are more familiar with the legistion than I am.

Senator JOHNSON. I wanted to put that in the record and I wanted you to try to explain that.

Go ahead.

Dr. YORK. In the Department of Defense the Advance Research Projects Agency is in charge of all space programs; and, insofar as space programs are conducted by the Army, the Navy, or the Air Force, they are under the management of the Advanced Research Projects Agency, as Mr. Johnson said, and that is the end of the road on the space program, as far as I am concerned.

My office, my job, is to supervise all research and engineering; and as such it is my job to coordinate the space program with whatever other programs in the Department of Defense that may be related.

Senator JOHNSON. Are you of the opinion that we are doing all that we can and should do in the national interest in this field?

Dr. YORK. I am a research and development man.

WE COULD BE DOING MORE, SAYS DR. YORK

Senator JOHNSON. I know what you are. I just want your opinion. Give me your opinion on it. That is what I want.

Dr. YORK. All research and development people are anxious to do more.

Senator JOHNSON. Now you have told me what they want to do. Now tell me whether in your opinion we are doing what we can do and what we should do.

Dr. YORK. We could do more.

Senator JOHNSON. Do you think we ought to be doing more?

Dr. YORK. I am not in a position to judge the question of how this fits in with the entire national picture.

Senator JOHNSON. You know we could do more, but you do not know whether we ought to do more or not?

Dr. YORK. The question of how the total national effort should be divided amongst all the various things it has to be divided amongst is something which is for higher authority than me to make a final judgment on.

We could do more.

Senator JOHNSON. We have a little to do with it. That is why we would like to have your recommendations.

If we could finally get an opinion out of you, we would appreciate it.

Dr. YORK. We could do more.

Senator JOHNSON. I understand that. Would you recommend we do more? You see what a problem we have. Here we have got these experts on top of experts on top of experts, supervisors, supervisors, supervisors, supervisors.

We are trying to find what their judgment is, not that we are going to accept that judgment or not that we are going to repudiate it. We just want it if we can get it. We do not want you to be contradictory to your chief, your supervisor, or your boss.

You know we can do more. In the light of your experience, in the light of your training, in the light of what knowledge you have and certainly it is outstanding in this field, perhaps the best, is it your judgment that we should be doing more?

Dr. YORK. Sir, I am undergoing a metamorphosis at the present time. When I was within ARPA I was fairly well convinced that we probably should be doing more.

Now that I have a look at what else is going on, what else has to be going on, the question of how to distribute the resources in terms of both money and people, I am no longer convinced and I haven't had a long enough time to see the whole picture and see how it forms a complete unit.

Senator JOHNSON. So far as we are concerned, we just have to make the best guess we can. You could not help us?

RECENT EXPOSURES HAVE AFFECTED YORK'S OUTLOOK

Dr. YORK. I hope to be able to help you in the future and I would have been able to help you a month ago but I have learned a lot in the last month.

Senator JOHNSON. Are you answering this way because of the Budget Director's letter?

Dr. YORK. I do not think so.

Senator JOHNSON. Have you read it?

Dr. YORK. I am not sure which one you are referring to. I think I probably have.

Senator JOHNSON. The one of December 31 from Mr. Stans to the Honorable Neil McElroy.

Dr. YORK. Yes; I have seen it.

Senator JOHNSON. The answer is indicated that you have read it carefully.

Dr. York, did this letter have any effect on your answer?

Dr. YORK. Everything in my experience has some effect on my answer. I suppose this letter does, too, but I think I can honestly say I would have made the same answer without having seen the letter.

Senator JOHNSON. I would like to insert at this point in the record the letter from Mr. Stans to Secretary McElroy dated December 31, 1958, the last paragraph of which reads:

Please see that a reminder of this reaches all officials and employees who participate in hearings on appropriations and on legislation directly related to budget proposals, including civil functions of the Corps of Engineers.

(The letter referred to is as follows:)

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., December 31, 1958.

Memorandum for the Honorable NEIL H. MCELROY:

The President will shortly present his budget for the fiscal year 1960 to the Congress. As you know, the normal process of budgeting results in recommended amounts that in many cases are less than the agency head had requested.

It is understandable that officials and employees will feel strongly about the importance of their own agency's work, and will sometimes believe that a larger budget might be in order.

Such feelings, however, must be related to an awareness that our budget resources are not adequate to accommodate in any one year all of the things that might be desired. The President is responsible for reviewing the total needs of the executive branch in the light of tax and debt policy and for deciding among competing requests for priorities.

Executive branch personnel are expected to support the President in his budget recommendations.

As you and your staff prepare to justify your portion of the budget before Congress, you will want to observe the requirements set forth at the President's direction in Bureau of the Budget Circular No. A–10. It is expected that witnesses will carefully avoid volunteering views differing from the budget, either on the record or off the record. While direct questions at hearings must be answered frankly, it is expected that a witness who feels that he must set forth a personal view inconsistent with the President's budget will also point out that the President's judgment on the matter was reached from his overall perspective as the head of the Government, and in the light of overriding national policy.

The witness should make it clear that his personal comments are not to be construed as a request for additional funds.

Please see that a reminder of this reaches all officials and employees who participate in hearings on appropriations and on legislation directly related to budget proposals, including civil functions of the Corps of Engineers.

MAURICE H. STANS, *Director.*

Senator JOHNSON. Mr. Holaday, are you of the opinion that we are doing all we can and all that we should do in the national interest?

HOLADAY SAYS GREATER SPEED IS NOT NECESSARY

Mr. HOLADAY. Sir, as was pointed out here, I made recommendations to the Secretary that in certain programs, particularly in Polaris, we could move at a more rapid rate. Now when you take an overall balance of our program, I have to concur that I think we have got a well-balanced program.

It is true that we could go faster, but when you try to balance the various factors that are in the overall defense program, I think I concur that this is a balanced and well-organized program.

Senator JOHNSON. So it would be a fair summary of your viewpoint to say you think we could go faster but that it is not necessary that we should go faster?

Mr. HOLADAY. That is right.

Senator JOHNSON. Is that true?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Senator Stennis?

Senator STENNIS. Mr. Chairman, I have no questions now.

Senator JOHNSON. Senator Saltonstall?

Senator Symington?

Senator SYMINGTON. Mr. Chairman, some of this testimony yesterday is bewildering, and if the Chair will allow me, I will read a short statement and then I would like to ask the witness to comment on it.

Senator JOHNSON. Proceed, Senator Symington.

Senator SYMINGTON. The testimony before this committee yesterday developed a sequence of points which led to one obvious conclusion that was not brought out, at least during that day's testimony.

There was one major and significant point not touched on at all, our lack of defense against submarine-launched missile attacks. The points made during Thursday's testimony by Secretary McElroy were:

The United States has no intention of matching the Russians missile for missile in the ICBM field. Therefore, the Russians will have a numerical superiority in future years.

However, the United States will maintain superiority in overall striking power with our diversified arsenal of intercontinental and shorter range missiles and manned heavy bombers.

The testimony by General Schriever, the commander of the Air Force Ballistic Missile Division was that in view of the very great danger we should be building very large ICBM forces.

We have the capability to build more.

General Schriever advocates serious reconsideration of this question, in view of what he calls the Soviet missile threat involving not only the security, but the survival of the United States. Secretary McElroy has admitted that we will build many less ICBM's than the Russians over future years and General Schriever has testified that we not only should build more but can build more.

HYPOTHESIS OF THE IMPORTANCE OF AIRBORNE ALERT

General Power, commander of the Strategic Air Command, testified that the Air Force is not maintaining an airborne alert, that is, it is not keeping any bombers aloft for retaliation in the event of a Soviet attack.

The point clearly drawn from the foregoing position is the following: If the Soviets will have such a superiority in ICBM's 2 or 3 years hence, they can use that portion of those missiles needed to destroy our ICBM's, and they can use the remainder against as much of our Strategic Air Command as is not airborne at that time.

Since there will be no warning of this attack, only those SAC bombers which are airborne at the time can be relied upon for effective retaliation. The conclusion is if the Soviets are to have a significant ICBM superiority 2 to 3 years hence, they can in a matter of minutes destroy our relatively small missile force and the SAC manned bomber force not in the air at the time of the surprise attack.

If at that time, as is currently the case, none of our SAC bombers are on airborne alert, the simple conclusion is that with a significant missile superiority the Russians 2 to 3 years hence could wipe out our entire manned and unmanned retaliatory force.

Therefore, the most useful addition to the current budget would be whatever is required to keep a significant number of our SAC bombers airborne throughout the perilous next 2 or 3 years, and to be sure that the Soviets are apprised of this retaliatory capability in the air.

Obviously, therefore, we should have more ICBM's sooner and also they should be dispersed and the bases hardened as quickly as possible.

Now on radio and TV last night and in the press this morning a statement is made to the effect that the United States plans to have 200 operational ICBM's, as against the estimate of a possibility of 600 for the Soviet Union, in the next few years.

Regardless of where that statement came from, it is not supported by the facts, and the figure I presented some days ago, 4 to 1, is conservative.

Yesterday the following testimony occurred in this hearing:

Mr. WEISL. I believe you stated that the first operational squadron of ICBM's will be ready in July of this year.
Secretary MCELROY. Yes, sir.
Mr. WEISL. Those will be at Camp Cooke?
Secretary MCELROY. That is correct, sir.

That is not correct. There is no plan for the United States to have anything like one operational squadron of ICBM's in July of this year.

Maj. Gen. Bernard Schriever, who has been in direct charge of the ICBM program for the past 4½ years testified to this committee yesterday that the schedule for additional operational capability of the Atlas has not been changed since 1955.

Specifically, he stated:

We have not moved up the Atlas program schedule. We were unable to. I mean it isn't because we didn't try. We had been on an extremely tight schedule ever since the program got underway.

Despite this, the Department of Defense has been giving a changing and an increasingly optimistic picture of the scope of our operational capability with the Atlas during the past 2 weeks.

Consider this series of statements. The President's budget message which was submitted to the Congress on January 19 stated:

The Atlas intercontinental ballistic missile has successfully completed a full-range test and the first operational Atlas missiles will be at launching sites by the end of the current fiscal year.
Additional missiles will be put in place in 1960.

SENATOR SYMINGTON CALLS STATEMENT AS TO ICBM CAPABILITY MISLEADING

Elsewhere in the budget document, on page 449, it was stated:

Of great significance of our deterrent capability is the Atlas ICBM, which will become operational during the current fiscal year. Missile capability and the strategic forces will be strengthened by activation of the first wing of strategic missiles.
Additional ballistic missile squadrons will be introduced in the operational forces during 1960.

This statement is obviously misleading. There will be no ballistic missile squadron operational this year.

If the first reference is to a Snark squadron, therefore, it should be so stated. It is not a ballistic missile system.

If for fiscal reasons and reasons of tradition this administration is planning, as now at least they admit they are planning, to pass over superiority in the most important new weapons to the Soviets while they rely in the main on a weapons system they themselves admitted yesterday is increasingly obsolescent, I believe they are jeopardizing the security of the United States.

To me that is bad enough, although it may be their right. But it is not their right or anybody's right to continue to present an inaccurate position of our defenses to the American people.

Mr. Director, if you care to comment on what I have said, I will be very happy to have you do so or have Secretary McElroy file any answer he would like to that statement.

Thank you, Mr. Chairman.

Senator JOHNSON. Mrs. Smith? Mr. Bartlett? Mr. Case of South Dakota?

Senator CASE of South Dakota. Mr. Chairman, in view of the way the record is being made here on budget directives and so forth, and I have no objection to the inclusion of the letter from Mr. Stans, I should like to ask permission to insert in the record the letter signed by President Truman in November of 1946 which was substantially the same, if not a stronger directive.

Mr. Chairman, I should like to place in the record the letter of Mr. Truman's written and signed in November of 1946, directing the Bureau of the Budget to advise heads of executive agencies that they should support only the recommendations of the President. That is pertinent here because we have been considering the delay in the Atlas program in the year of 1946.

There was some $75 million transferred away from research and development to the fiscal service of the Army, which resulted in the suspension of project MX–774, which was the initial Atlas project.

The testimony before the Appropriations Committees of the Congress at the time was that that caused a lag of a year and a half in the development of the missile program.

May I submit that letter for the record?

Senator JOHNSON. The Senator certainly can. I have no objection if he wants to go back as far as McKinley, as far as I am concerned. This Administration has had 6 years to do something about it and that is what we are trying to find out, what they have done about it.

Senator CASE of South Dakota. And in view of the statement which has just been made by the distinguished Senator from Missouri as to what has been done or has not been done, I would invite attention to the fact that the missile funding by this administration in 1954 was something over $500 million as opposed to less than $300 million in the prior year, and since then has gone up to $3,900 million proposed in the budget for production and procurement of missiles in the next year, and with the additional amounts for the total missile program, including the Polaris submarines, is something like $7 billion for the budget.

(The letter referred to is as follows:)

MEMORANDUM FOR THE DIRECTOR OF THE BUREAU OF THE BUDGET

I have noticed that on several occasions certain department and agency officials have shown a tendency to seek from Congress larger appropriations than were contemplated in initial budget estimates.

The estimates which I transmit to Congress reflect a balanced program for the executive branch as a whole, and each individual estimate is considered in the light of this program, its relationship to other estimates, and the fiscal position of the Government.

While agency witnesses before congressional committees must feel free to supply facts in answer to questions of committee members, I cannot condone the practice of seizing upon any opportunity which presents itself to indicate an opinion, either directly or indirectly, that my estimates are insufficient.

When you notify the heads of the various departments and agencies of the amounts to be included in the budget for their activities, I wish you would include a reminder that I shall expect them and their subordinates to support only the President's estimates in hearings and discussions with Members of the Congress.

HARRY S. TRUMAN.

NOVEMBER 15, 1946.

Senator JOHNSON. Will the Senator yield to me a minute?

Senator CASE of South Dakota. Surely.

Senator JOHNSON. The Chair wants to make it perfectly clear that he is not defending the record of anyone or criticizing the record of this administration. All he wants to do, if he can, is to find out from every expert that he can, where we are, are we doing all we can do, and are we doing all we should do.

Senator CASE of South Dakota. I think the Chair has been perfectly fair and clear with this statement of objectives and I subscribe to it that the principal job here is to find out what can be done and are we doing it.

Senator SYMINGTON. Will the Senator yield to me for one short statement? He mentioned my name.

Senator CASE of South Dakota. I do not want to use up all my 5 minutes.

Senator SYMINGTON. Mr. Chairman, I have great respect for the distinguished Senator from South Dakota, but I do trust he will not extend his historical review back to the point where he criticizes President Hoover for not spending as much money on airplanes as President Roosevelt.

Senator CASE of South Dakota. Mr. Holaday, with respect to the Polaris submarine recommendation, I think that is a very significant field.

FUNDS WERE RELEASED FOR ONE POLARIS SUBMARINE

I have been out to Sunnyvale and I am very much interested in the Polaris program.

Now you recommended that funds be released for two, did you not?

Mr. HOLADAY. That is right.

Senator CASE of South Dakota. Funds were released for one?

Mr. HOLADAY. Yes, sir.

Senator CASE of South Dakota. Were the long-lead items funded for the second submarine?

Mr. HOLADAY. In the 1960 budget there is the long-leadtime items for additional submarines. I believe it is three.

Senator CASE of South Dakota. For four?

Mr. HOLADAY. I believe that is right.

Senator CASE of South Dakota. I was under the impression it would be four to six.

Mr. HOLADAY. No.

Senator CASE of South Dakota. Will you check on that and place that in the record?

(The information was subsequently supplied as follows:)

The fiscal year 1958 Polaris FBM program included the construction of three Polaris submarines (SSBN's 1–3). The fiscal year 1959 budget, including the amendment, provided for the construction of two additional submarines (SSBN's 4–5) and $59.6 million for advance procurement. These funds have been utilized as planned. The long-leadtime components thus procured will be used in the four submarines (SSBN's 6–9) added by Congress in fiscal year 1959. The fiscal year 1960 budget estimates include $54 million for the advanced procurement for three additional submarines. SSBN's 10–12).

However $59.6 million of the $405.3 million added by the Congress (for SSBN's 6–9) in fiscal year 1959 will not be required for these boats due to prior funding for advance procurement in the fiscal 1959 basic program but will be applied as assets for the construction of a new FBM tender in the fiscal year 1960 program.

With respect to submarines, funds have been released for the construction of six submarines (SSBN's 1–6), the sixth submarine having been authorized on January 1, 1959.

Mr. HOLADAY. I will, sir.

Senator CASE of South Dakota. Testimony we had before the Armed Services Committee in closed session last week would indicate that, and I do not want to go into all of it because part of it is classified.

Mr. HOLADAY. It will be classified and I will have to put it in the record as classified information.

Senator CASE of South Dakota. I do think the point ought to be clear, too, that funding by the Navy is regarded somewhat differently than by some of the other agencies.

The Navy does not regard anything as funded unless it is fully funded.

Mr. HOLADAY. That is correct.

Senator CASE of South Dakota. Now with respect to missile detection, having in mind this great thrust capacity evidenced by the Lunik, if we take the reports at face value, would you say that the location of the BMEWS detectors are correctly placed?

Mr. HOLADAY. Sir, I think the answer is "Yes." They cover the area from launching in Russia to give us warning against——

Senator CASE of South Dakota. Wouldn't it be possible with the thrust evidence in Lunik to use a different arc that might not be detected by the BMEWS stations presently sited?

Mr. HOLADAY. This is a technical possibility.

Senator CASE of South Dakota. Mr. Johnson, would a space satellite be useful or superior to the BMEWS idea in misisle detection? Do space satellites have any value for missile detection?

Mr. JOHNSON. Senator, we are studying this possibility in the form of a satellite carrying infrared sensors to detect missiles very early in their trajectory, perhaps even as they leave the earth's atmosphere, and then to track them. However, we are a long way away from translating this into fact.

SATELLITE DETECTION 6 OR 7 YEARS AWAY

I would say that it will not be technically possible for 6 or 7 years, if at all, and in the meantime BMEWS is the best we have available. We support it.

Senator CASE of South Dakota. But you would agree with Mr. Holaday's statement, his general statement that this matter of antimissile operations and missile detection is of the highest priority?

Mr. JOHNSON. The Advanced Research Projects Agency has in the 1959 budget $100 million of very basic research. We hope this research will lead, in the next 10-year period, to a really effective system that will protect us from the enemy's missile.

Senator CASE of South Dakota. Mr. Johnson, your accomplishments as an officer of General Electric would not normally be of interest to our immediate inquiry, but since the question was raised here this afternoon, what you did as the executive vice president of General Electric is important as a yardstick in measuring what we are now doing.

I think you said in 11 months you had gotten more done than you had in a comparable time in industry. You were, were you not, the executive vice president of General Electric from 1948 to April 1958?

Mr. JOHNSON. That is correct, sir. I was, and had complete responsibility for various divisions of the company, including electronics. I was one of the chief officers.

Senator CASE of South Dakota. Were those stagnant years, or were they fairly fruitful and productive as far as General Electric was concerned?

Mr. JOHNSON. I considered them very fruitful.

The earnings of the company increased through that period, year after year, and the net assets also increased proportionately.

Senator CASE of South Dakota. Then you would say that this progress in the 11 months you have been in this present work with the Government does represent a period of substantial accomplishment?

Mr. JOHNSON. Very definitely, sir; it does.

Senator CASE of South Dakota. Thank you, Mr. Chairman.

Mr. WEISL. May I make a statement, Mr. Chairman?

Senator JOHNSON. Have you concluded, Senator Case?

Senator CASE of South Dakota. Yes.

Mr. WEISL. I want to apologize to you, Mr. Johnson, for that quip. We always have a tendency to make a quip. Of course, I know by reputation and otherwise you have been an extremely successful and able man in industry, and I am very sorry that I made that quip.

Mr. JOHNSON. It is perfectly all right, sir.

Mr. WEISL. And I apologize.

Senator CASE of South Dakota. I trust the counsel does not object to my statement.

Mr. WEISL. Not at all. I just had one of those impulsive urges to make a quip and I am very sorry.

TRIBUTE FROM SENATOR JOHNSON

Senator JOHNSON. The Chair wants to observe that he knows very little about Mr. Johnson's industrial record, but he has had him before the committee frequently, on occasions. He has always been very frank and very able and I consider him to be quite a patriot to come and do the job he has done. He has impressed me every time he has appeared before the committee. I may have to make a quip and ask you what you did before you went to General Electric, but that does not have anything to do with what you are doing now.

Mr. JOHNSON. Thank you, Mr. Chairman.

Senator JOHNSON. What I am interested in is whether you are satisfied with what you are doing now, and whether you think you are getting ahead as fast as we ought to get ahead. And I do not mean, if you are not satisfied, that you have to criticize somebody. I just want to get your judgment so I can form a judgment on it. We are not up here to find any scapegoats or to paint a rosy picture that does not exist. We are here to find the plain, unvarnished, unadorned facts that we can and then do whatever we can do to help clear up the situation and give the people the truth, give them an honest count, let them know what the picture is, and then do what is necessary to correct it if it needs correcting.

Senator Wiley?

Senator WILEY. Mr. Chairman, I feel I might say to this distinguished trio that it comes to my mind to say that fools rush in where angels fear to tread. You people are experts in a very—let us say—expert field.

I have a few questions.

The opening statement suggested that it was related to the preparedness in space, in our space program. Let's say is these any lack of preparedness from the observation of you three people in the space program during the time you have been associated with it?

That calls for a conclusion. I have tried many law suits on conclusions because it is the business of experts if they want to substantiate that with the facts, but I am not going to spend all afternoon trying to dig out something when you people can answer the question "yes" or "no."

If there is a lack, I want to know where there is a lack. If you think that there isn't that lack, say so.

Mr. JOHNSON. Mr. Senator, I would like to comment on this. I think the problem in space, of whether we are ahead or whether we are accomplishing what we should, is involved in the matter of thrust because Russia has put up big payloads.

We do not yet have the capability of putting up the same payload. But I would like to say this: The Advanced Research Projects Agency began to study the very first day it was organized, what should be done on a million pound or a million and a half pound thrust engine.

On August 15 we placed an order on the organization of Dr. von Braun, who is here today, for the development of a million and a half pound engine cluster using proven missiles. This booster is going to be static tested this year and will be flight tested in 1960, 2 years from the date we gave the order.

Now by doing this, making this decision quickly, we gained at least 3 years over going ahead with developing a single engine with a thrust of a million pounds.

Senator WILEY. Then you haven't been asleep, have you?

EXPECT CLUSTERED ENGINE VEHICLE TO FLY IN 1960

Mr. JOHNSON. No, sir; and we will be able to fly this vehicle in 1960.

Senator WILEY. Among you three gentlemen—and I see we are near Von Braun back there, whom we all know, honor, and respect—among

the four of you, is there any useless duplication in your efforts for your Government?

Mr. JOHNSON. I think, Mr. Senator, I would like to answer that, too. I believe that it is for the reason of eliminating duplication that the Secretary of Defense established one central space agency within the Department of Defense.

Senator WILEY. I said useless.

Mr. JOHNSON. In my opinion he did prevent useless duplication.

Senator WILEY. You have seen duplication here at the table, too, but we do not want to admit it is useless.

Now is there what you call cooperation? We heard the expression you "ride over each other."

I think the question should be, Do you override each other, or what happens when good brains get together?

Mr. JOHNSON. There are always differences of opinion. I think we have some of the most wonderful people in the world in the three military departments, and some of these brains are bound to have differences, and I think this is good. Sure, you have to override when there are differences of opinion. This is natural.

Senator WILEY. Because there is analysis today of the activities of the three of you, I want to find out again, Is there any waste because of the teamwork of the three of you?

Dr. YORK. I think it is fair to say that there isn't, and one of our principal objectives is to make sure that there isn't.

Senator WILEY. Make sure what?

Dr. YORK. Make sure that there isn't waste.

Senator WILEY. Now, something was said about a 30 percent that you did not get.

What were you going to use that 30 percent for?

Mr. JOHNSON. Long-lead-time items that would be required in the years ahead. For example——

Senator WILEY. Wait a minute; the years ahead?

Mr. JOHNSON. Yes.

We would have to fund now lead-time items. For example, this million and a half pound clustered engine will have a lead time of about 29 months, and we have to have incremental funding in 1960 in order to buy and have ready for delivery the 6, 8, 10, 12 of these vehicles that we will want in 1960, 1961, and 1962.

It is this kind of money that will have to be delayed. Hopefully, we will get it in another appropriation.

Senator WILEY. Could you tell me the similarity or dissimilarity between a missile and a satellite?

Mr. JOHNSON. A missile is a vehicle to put a satellite into orbit. A satellite disconnects generally from the basic booster and there is quite a difference between the satellite and the booster.

Senator WILEY. Now is there anything where you can do more with what you have been assigned or would you have done more if you got your 30 percent, and if so, does the lack of that interfere with arriving at the results that you want to arrive at, or say arriving at the national defense?

MORE MONEY WILL BE REQUIRED IN YEARS TO COME

Mr. JOHNSON. I say I do not believe it will have any negative effect in fiscal year 1960, but we will have to have more funds in this satellite work if we are to follow through with the program we have started.

Senator WILEY. When?

Mr. JOHNSON. In 1962 and subsequent years.

This is going to have to be an increasing fund of money every year for at least 6 or 7 years before we level off.

Senator WILEY. Thank you very much.

Senator JOHNSON. Senator Magnuson?

Senator Martin?

Senator MARTIN. I am very much interested in the coordination of the work of the Defense Department that you are primarily carrying on, and the matter of liaison, proper understanding and coordination with the civilian activities.

I believe that comes mostly in your field, doesn't it, Mr. Holaday?

Mr. HOLADAY. Yes, sir.

Senator MARTIN. And in your opinion, is it running along smoothly and efficiently?

Mr. HOLADAY. I think both Mr. Johnson and I can answer you on this.

Sure, we have many problems and many discussions. So far, the problems we have had, we have been able to resolve.

As I pointed out, the resolving of the space track. We are now working and pulling together on a national booster program, and I think as I pointed out, there are many other problems to work on but we are resolving the problems. We are stepping right up to them and we are getting the fellows to work together and come out and have the minimum amount of duplication, if any at all, and work toward one national program.

Now Mr. Johnson, I think, could add to that from his point of view because he is part of this coordination work we are attempting to do.

Senator MARTIN. Your prime interest is in the field of guided missiles, is it?

Mr. HOLADAY. In the Defense Department my job is primarily guided missiles.

The Chairman's job is between the two.

Senator MARTIN. Yes.

Of course, you are interested in the Defense Department and you have this coordination or liaison work as your main activity just now.

Mr. HOLADAY. Well, I am in the transition period now. With Dr. York coming aboard—I have not been able to devote an awful lot of time to the Chairman's job although I would say I have been averaging at least 1 day a week on that activity. With Dr. York aboard, at the time he can pick up this, it will give me more time to work on the Chairman's job.

Senator MARTIN. This morning I discussed briefly with Dr. Glennan his statement that they were a bit disappointed to miss getting the Defense Department Army Ballistic Missile Agency over into

his field of operation. He indicated, however, that he had very good coordination between his organization and Defense, that the civilian end of it was slowed up possibly a bit by not getting the ABMA program within his own unit.

I would like to know your opinion on how the guided missile program of the Department of Defense is getting along separated as it is from the activity of the NASA.

Mr. HOLADAY. I do not quite understand your question.

Senator MARTIN. In my brief talk with Dr. Glennan this morning, I gathered that they regretted not getting the ABMA program from the Defense Department for NASA and that it would slow them up a bit.

I am particularly interested in the progress of the guided missile program and its application to our national defense, and I wondered what your opinion is about the progress of the guided missile program, as I got from Dr. Glennan's statement this morning.

Mr. HOLADAY. Sir, I would like to answer your question from the guided missiles part of the activity.

In the consideration of Dr. Glennan's request for transfer of a part of ABMA's staff and activities to NASA, we had to look very carefully at the missile program which was being carried by ABMA, and there are several very important missiles being carried there.

One of the important ones at the time was the Jupiter IRBM.

Now, therefore, we did have to raise the red flag in transferring these facilities to NASA as of that time because of what effect it may have on the missile program.

We were not given a lot of time to study it in detail. They were carrying important programs. Therefore, the recommendation of the Department of Defense was that it could possibly interfere with our missile program.

Senator MARTIN. You are very much in favor of the program carrying on as it is now carrying forward?

AGREEMENT THAT THERE IS COOPERATION BETWEEN ABMA AND NASA

Mr. HOLADAY. I am answering this from where I am working and watching Dr. Glennan's work in the coordination back and forth between the Defense Department and NASA. We are getting very excellent cooperation and very excellent help from the ABMA group.

Senator MARTIN. Dr. Glennan indicated he is very pleased with the progress made and I wanted to have your opinion on that.

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Dr. York, Mr. Holaday, Mr. Johnson, we want to, on behalf of the committee, thank you for appearing here before us.

Senator SYMINGTON. Mr. Chairman, I would like to yield to the Chair. I thought you were dismissing the witnesses.

Mr. Johnson, I want to congratulate you for the orbiting of the Atlas. More than any other person, you are responsible for it. You pushed it, took a chance and won. I would like to congratulate you for that.

As I understand it, when you are working there are three things that you ought to know. The first is, who reports to you; the second is, to whom do you report; and the third is, what are you supposed to do.

Based on your position today in this picture, are you satisfied that you are fully apprised under those three premises?

Mr. JOHNSON. Yes, sir, I am.

Senator SYMINGTON. As to what you are doing?

Mr. JOHNSON. Yes, I am on all three.

Senator SYMINGTON. Thank you.

Dr. York, are you, too?

Dr. YORK. Yes, in the limitation that I am still in the process of working these things out, but it is going well and I believe will come out correctly.

Senator SYMINGTON. Mr. Director Holaday, are you, too?

Mr. HOLADAY. Yes, sir. My job is always changing, as you well realize.

I understand what my new assignment is, and my old assignment has not been modified enough yet that I can say I understand it.

Senator SYMINGTON. Thank you.

Thank you, Mr. Chairman.

SENATOR JOHNSON DELINEATES RESPECTIVE RESPONSIBILITY

Senator JOHNSON. Dr. York, Mr. Holaday and Mr. Johnson, we went to some length this afternoon to attempt to develop from your testimony the divisions of authority and methods of coordination between the Department of Defense, NASA, and the other interested agencies, and we tried to review with you as thoroughly as a hearing like this would permit the substance and adequacy of the programs with which you are connected.

Dr. York, you are the Director of the Defense Research and Engineering. Mr. Holaday, you are Director of Guided Missiles and in addition chairman of the Civilian Military Liaison Committee.

Mr. Johnson, you are Director of the Advanced Research Projects Agency. Is it fair to say that the conclusion to be drawn from your testimony is that, although you in some cases have not been allowed all the money that you asked for, or that you felt might be desirable, nevertheless, you think from the standpoint of substance and adequacy of your program that you are pleased and satisfied?

You think that you are doing, if not all you can do, at least all you should do in the general picture? Mr. Johnson, I ask that question for this reason. We have a responsibility in connection with the work you are doing. We want to discharge that responsibility. We are not the action arm of the Government and there is not much we can do about getting people to do things they do not want to do. We can even give them more money than they ask for sometimes and it is not used.

MAYBE WE WON'T HAVE TIME NEXT TIME

But I remember some of our folks were very concerned about our preparedness situation prior to World War II. I remember walking out one Sunday a few hours before Pearl Harbor and picking up an American magazine, I think it was in front of the drugstore, which said, "We can whip them in either ocean," signed by Frank Knox, Secretary of the Navy.

Shortly thereafter our fleet was upside down in Pearl Harbor. Maybe we won't have even that much time next time.

This committee has to rely upon the people in the executive branch of the Government not only for action, because that is the action arm, but for judgment upon which we can formulate opinions and policy.

We are anxious to save every dollar of the taxpayers' money we can.

We want to be just as prudent and thrifty as you do. But we want to be sure that we haven't been too thrifty, so thrifty that we lose our freedom and lose our lives. And we have to rely on men like you. I have concluded from your general performance today that with the knowledge you have of this program and with the intimacy that you work with it, that it is your best judgment that you are doing all you can and should do in the national interest in the field in which you are engaged.

SENATOR JOHNSON APPEALS FOR THE COLD FACTS

If you are not, I want you to say so on this record so that the world will know and we can then evaluate what you have said and try to do something about it, at least so far as we are concerned. We did not ask you to come here and criticize anybody or paint a rosy picture. I repeat, we are not after scapegoats or optimists. We just want the cold facts. The people are entitled to that—the people pay the bills.

While there is not much we can do about it, we can at least provide a forum where you can be heard, and pretty soon there is something the people can do about it, and if they need to do something about it, we want them to know it.

Do you think so far as the substance and adequacy of your program is concerned, that you are pleased and satisfied with it, Mr. Johnson?

Mr. JOHNSON. Mr. Chairman, if I can answer the question this way: In ballistic missile defense and solid propellant chemistry for which I am charged with responsibility, I would agree, we are, I think, doing a good job, and I do not think we could effectively spend more money.

But I am honestly concerned about our total space program and the adequacy of it at this point in time. Not only in terms of the responsibility of my agency, but in terms of the joint responsibility of NASA and ARPA, I believe the program should be funded on a higher level in 1960 so that we do not have to do some things that might be costly in the 1961 budget.

Senator JOHNSON. Would you go into a little detail there, more than you have recommended?

Mr. JOHNSON. Yes, sir. I think that we could and should have a faster developing booster program. The booster program we have now is good, but it could be speeded up. I think we have got to spend more money right now in a better tracking capability.

I believe there are other technical aspects of our program, including upper stages, that do need to be pursued—I am not saying this in the context of the ARPA budget. I am saying this in the context of the total national space effort.

Senator JOHNSON. And what would be your general estimate of how much it would cost to accelerate these programs generally?

RECOMMENDATION FOR SUPPLEMENTAL APPROPRIATION IN FISCAL YEAR 1959

Mr. JOHNSON. I believe in fiscal year 1959 that there should be a supplemental appropriation.

We have asked the Secretary of Defense in ARPA for some $40 million supplemental funds to pursue the big booster. We have asked for more money for early warning satellites and for another classified program that the Joint Chiefs of Staff have proposed to us just recently.

The new civilian agency and ourselves have also discussed other funding that is needed in 1959. In other words, I believe that something in the order of $150 million more money is needed in fiscal year 1959, and that the same amount of money is needed, perhaps a little more, in fiscal year 1960.

Senator JOHNSON. You are speaking of the supplemental?

Mr. JOHNSON. Supplemental for 1959, yes.

Senator JOHNSON. Over and above what is in the budget?

Mr. JOHNSON. What has already been authorized and approved by Congress.

Senator JOHNSON. Now you were cut 30 percent. How many millions of dollars were involved?

Mr. JOHNSON. In the space effort, I think our cut was something in the order of $100 million.

Senator JOHNSON. If you had your way about it, you would restore $150 million in the supplemental budget?

Mr. JOHNSON. In the total national space effort, that is correct, sir.

Senator JOHNSON. And how much of that would come to your operation, $100 million?

Mr. JOHNSON. Somewhat less than that.

Senator JOHNSON. Your share.

Mr. JOHNSON. Yes, that is correct, sir.

Senator JOHNSON. I want to thank you very much for your frankness. You are still operating under the letter?

Mr. JOHNSON. Oh, I may not have a job.

Senator JOHNSON. Well, I think you have been more concerned with the way you have done your job and the success of it than how long you keep it. The people are concerned with the end result, and you won't have much trouble keeping your job.

Dr. York, would you care to elaborate any on what you have told the committee? Is it fair to say that, generally speaking, you are satisfied with the substance and adequacy of the program in which you are involved?

Dr. YORK. The programs in which I am involved are all research and engineering in the Department of Defense. I have a great deal to learn. I don't know from personal knowledge whether they are adequate or not. I do know that the programs as they now exist were made up by people whom I, by and large regard, as responsible and able.

Senator JOHNSON. The reason you don't know is because you have been there such a short time?

Dr. YORK. That is correct. However, it is a sure thing that there are inadequacies; that these are not necessarily inadequacies in funds. They can be wrong approaches.

Senator JOHNSON. I am talking about the substance and adequacy. Don't confine yourself just to gold.

DR. YORK SAYS HE'S NOT AWARE OF ALL THE PROBLEMS YET

Dr. YORK. There are a number of things in which no doubt corrective measures are needed, and I am sure that while I may have some idea about some of these, that most of them I am not even aware of yet. I hope to become aware of them as soon as I can.

Senator JOHNSON. Are you aware of any that you can tell the committee about?

Dr. YORK. I think that probably our basic research program needs further improvement. I think we probably need more work in such matters as materials, for example.

Senator JOHNSON. Does that conclude your statement?

Dr. YORK. Yes, if you are satisfied.

Senator JOHNSON. Mr. Holaday, are you generally satisfied with the substance and adequacy of the program with which you are familiar?

Mr. HOLADAY. As of today, this is correct, sir. I would like, however, to point out that we continue our studies.

We are still working on several of the programs considering whether they are going fast enough, and I feel sure that as we go along through these studies, if I feel like they should be accelerated at any time, I am going to make my recommendations. This can be done by adding more money to the budget or reprograming within the amount of money we have.

Senator JOHNSON. But you are convinced that there is a sufficient sense of urgency, a sufficient determination, a sufficient awareness of the problems we have to cope with to make you tell this committee that in general you are satisfied with the progress that this Nation has made?

Dr. YORK. That's right, sir.

Senator JOHNSON. Thank you very much, gentlemen.

Senator CASE of South Dakota. Mr. Chairman, may I ask one question? I would like to address it to you three jointly.

Some years ago when we were dealing with activities which required a long lead time, when we were dealing with new things, you had the practice of providing so much cash and so much contract authority so that an agency might use contract authority as a guide for its planning and the best use of the moneys currently available, and also to permit it to give advance notice, so to speak, to the suppliers who would supply the materials, and they could take that into consideration in their planning.

Do you think it would be helpful, in view of the long lead time and the research that is involved, if you had contract authority in addition to your cash appropriation for some of these projects you have been discussing?

Mr. JOHNSON. If our funds were restricted as to the time they could be utilized then this would be very helpful.

Dr. YORK. In research especially that would be very helpful.

MR. JOHNSON PLEADS FOR CONTINUITY FUNDING FOR RESEARCH

Mr. JOHNSON. Research must have continuity. Research must have 5-year money in very, very substantial amounts. We can't have this business of turning the spigot, on and off, because lead time is very important.

Senator CASE of South Dakota. If you try to handle it by appropriations and you have to have 5-year money, so to speak, then we get into the very complicated thing of making appropriations for fiscal years 1955, 1956, 1957, 1958, you have a lot of columns of balances in fiscal year funds.

It has always seemed to me that where we have these long lead times, it is much simpler to make the appropriation for the actual cash requirements in a given fiscal year for actual expenditures, if you contract authority for the long lead items.

Mr. JOHNSON. This would help research, yes.

Senator CASE of South Dakota. That would help.

Mr. JOHNSON. Yes.

Senator CASE of South Dakota. What about that, Mr. Holaday?

Mr. HOLADAY. On the missiles, I don't know that this would help. We have been getting the missiles on more of a pay-as-you-go basis, although this is not uniform for all of the missile programs.

Senator CASE of South Dakota. What about the development of the Polaris submarine? You recommend a total of six additional Polaris submarines, in effect. Isn't it true that if you had some contract authority, you could plan accordingly, and the suppliers could do some planning if they knew for sure that you had authority or that the Defense Department had authority to contract for them?

Mr. HOLADAY. Without any doubt, this has merit. I am talking now strictly from the technical operation and not from the money side.

This has merit, so that planning can go on, and, if you are going to enlarge a shipyard, instead of putting down two ways, if you know in the next year you are going to need four ways, you can do four ways cheaper all at one time than you can two. It has very definite advantages on a program where you have got 30 months to 4 years lead time. This can also work in a ground-support program.

Senator CASE of South Dakota. Thank you.

SENATOR JOHNSON CITES WARNING OF DR. WATERMAN

Senator JOHNSON. Before you gentlemen leave, preparatory to Dr. von Braun's testimony, and just as a kind of a stimulant to all of us, I want to read a very brief paragraph from a letter to the President of the United States dated January 15, 1959, this year, signed by Dr. Alan T. Waterman, Director of the National Science Foundation:

> In the meantime, the evidence from other countries, and notably the U.S.S.R., shows the determination and a national spirit on the part of the people which seems to be relatively absent from the American scene. The recent educational group which went to the U.S.S.R. with the Commissioner of Education and likewise the group of university presidents, came away with the conviction that the Russian people see their way clear to world leadership in science and technology.
>
> They are apparently dedicated to this, not in the sense of military competition but, rather, of achieving world supremacy without the need of military domination.

Among other nations we shall ultimately have to reckon with the genius for organization and the industry of the German people, the industry and learning ability of the Japanese, and the industry and potentialities of the Chinese. As a Nation, we appear to forget that we live in a competitive world and shall continue to do so. It seems abundantly clear that we shall rapidly lose in competition unless we can show more determined and constructive efforts than we have during the past years.

Do you agree with that statement, Mr. Johnson?

Mr. JOHNSON. Absolutely correct.

Senator JOHNSON. Do you agree with it, Dr. York?

Dr. YORK. There is no question about it.

Senator JOHNSON. Do you, Mr. Holaday?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Then why are you so pleased and satisfied? Do you think we are making more determined and constructive efforts?

Dr. YORK. I said I wasn't sure.

Senator JOHNSON. Do you think we are doing all that we can do and should do? I have asked each witness that question for days. I don't want to promote any dissatisfaction; I just want to satisfy my conscience that whatever contribution that I should have made, I did make while I could still make it. I want to be sure that you have the opportunity to satisfy yourself before you leave the stand.

You agree with what Dr. Waterman said. Are we showing all the determination and all the constructive efforts that we should be showing now in the operation with which you are associated?

THE NEED FOR A GREATER EFFORT

Mr. JOHNSON. I repeat, Senator, that in the research and science field, I agree we should be putting more of our total gross output into acceleration of these fields.

I do believe Russia is a great threat technically to us, and I do not believe that we are spending enough money in the total research effort and in the scientific effort in this country.

Senator JOHNSON. Dr. York?

Dr. YORK. I am all for the statement. It applies not only to what we are doing in the Department of Defense but what we are doing throughout the entire country.

We do need to be doing more in the way of education as well as research, and so forth. It is a generally true statement that should cause us all concern.

Senator JOHNSON. How are we going to be doing more, though, if people like you don't come up here and say, "Here is what we think you ought to do, and here is the road we think you ought to follow"?

You come up here and you say, "Well, I am satisfied that as to the substance and the adequacy of the program we are doing pretty well, but I haven't got my directive yet."

We have such respect for your judgment and for your talent and for your experience that we asked you to come here and counsel with us. I hope that before we call you back that you will give some consideration to what are the determined efforts we ought to be making, what other constructive efforts we ought to be making, what good we can be doing that we are not doing; so we won't wake up and find out it is too late, if we wake up at all.

Mr. Holaday, do you have any suggestions?

Mr. HOLADAY. No. I feel quite a good bit like Dr. York on this. I think this is one of the questions we ask ourselves almost every night when we go to bed: Have you done the best you can during the day?

Senator JOHNSON. Thank you very much, gentlemen. We appreciate your patience, your courtesy, and your contribution.

Dr. von Braun.

Our next witness is Dr. Wernher von Braun, the Director of the Development Operations Division of the Army Ballistic Missile Agency. Dr. von Braun, will you come forward and take the witness stand, and we especially want to thank you for taking time out from your crowded schedule to be with us. As you know, it is our procedure to swear the witnesses. If you will please stand, I will swear you in, and counsel will proceed with the questioning.

Do you solemnly swear that the evidence you give to this committee on the inquiry now underway will be the truth, the whole truth, and nothing but the truth, so help you God?

Dr. VON BRAUN. I do.

Senator JOHNSON. Thank you.

Doctor, we are delighted to have you, and Mr. Weisl, will you proceed to examine the witness?

TESTIMONY OF DR. WERNHER VON BRAUN, DIRECTOR OF THE DEVELOPMENT OPERATIONS DIVISION OF THE ARMY BALLISTIC MISSILE AGENCY

(The biography of Dr. Wernher von Braun is as follows:)

DR. WERNHER VON BRAUN, DIRECTOR OF THE DEVELOPMENT OPERATIONS DIVISION, ABMA

Dr. Wernher von Braun is the Director of the Development Operations Division of the Army Ballistic Missile Agency. He was born in Wirsitz, Germany, March 23, 1912. He won his bachelor's degree at the age of 20 at the University of Berlin, and received his doctorate in physics in 1934 at the same institution.

In 1930 he joined a group of inventors who constituted the German Society for Space Travel. In 1932 he was employed by the Ordnance Department of the German Government. From 1932–37 he was chief of a small, liquid-fueled rocket development station near Berlin. The rockets identified as A–1, A–2, and A–3, forerunners of the V–2, were developed here.

He became technical director of the Peenemuende Rocket Center in 1937, where the V–2 was developed. In the closing months of World War II he led more than 100 of his fellow scientists to the West and surrendered to the Allied Powers.

Dr. von Braun came to the United States in September 1945 under contract with U.S. Army Ordance Corps. He worked on high altitude firings of captured V–2 rockets at White Sands Proving Ground, N. Mex. Later he became project director of a guided missile development unit at Fort Bliss, Tex., which employed 120 of his Peenemuende colleagues. In April 1950, the entire group was transferred to Redstone Arsenal at Huntsville, Ala., then designated the development center for Army rockets and ballistic missiles. Dr. von Braun was appointed director of development operations. On February 1, 1956, the ballistic missile activity concerning long-range rockets was shifted from Redstone Arsenal to the Army Ballistic Missile Agency at the same location. Dr. von Braun continued as development operations director.

Dr. von Braun and 102 of his colleagues and their families received American citizenship April 14, 1955, in Huntsville.

Dr. von Braun was a member of the Special Committee for Space Technology, National Advisory Committee for Aeronautics, Washington, D.C., until this committee was dissolved on December 3, 1958. He is a fellow of the American Rocket Society, American Interplanetary Society, British Interplanetary Society,

German Rocket Society, and Norwegian Interplanetary Society. He is president of the Rocket City Astronomical Association in Huntsville.

Among the honors and awards recently received by Dr. von Braun are: The Distinguished Federal Service Award of the President of the United States, presented 1959 by President Eisenhower; the Department of Defense Distinguished Civilian Service Award, presented in 1957 by Secretary of Defense Charles E. Wilson; the Department of Army Decoration for Exceptional Civilian Service; the Astronautics Award presented by the American Rocket Society; the Space Flight Award presented by the American Astronautical Society; and a citation of merit for contributions toward the advancement of the science of rocket and missile propulsion, presented by the National Military-Industrial Conference, February 1958.

Mr. WEISL. Dr. von Braun, you have had more experience in the missile and satellite field, I believe, than any other witness who has ever appeared before us. How long have you been interested in the satellite and missile field?

Dr. VON BRAUN. I have been in active rocket developments since 1930. At that time, of course, our efforts was carried on on a very modest scale.

Mr. WEISL. And since then?

Dr. VON BRAUN. My first connection with rocket development was through the activities of the German Society for Space Travel in 1930. We had a small proving ground in the vicinity of Berlin where our small liquid fuel rockets were tested.

In 1932, the German Army became interested in what we were doing, and so I became a staff member of the German Ordnance Corps. Out of this activity, which started on a very humble scale, the German rocket and research center at Peenemuende emerged where the V-2 rocket was developed during the last war.

It was mainly as a result of my work at Peenemuende that along with a little over 100 of my associates I was invited to come to the United States right after the war.

During the first 5 years after the war, we worked mainly in applied research and development in the rocket field. In 1950, our small group was moved from Texas to the Redstone Arsenal in Huntsville, Ala., and we were assigned to develop the Redstone ballistic missile at that time. It was in the spring of 1951 that final approval for the Redstone was obtained.

In the meantime, the Redstone has been fielded by the Army. In 1955 we received another assignment, the development of the Jupiter IRBM missile system.

Mr. WEISL. You have had considerable experience in the space field; have you not?

Dr. VON BRAUN. Yes, sir. During the early years of my career in rockets, space flight was, of course, strictly an amateur's interest, although it has always been the driving force behind my interest in rocketry.

I was given the first opportunity to contribute something practical in the space flight field when our Jupiter-C reentry test vehicle was approved to be used as a satellite carrier. It served as a carrier of the Explorer satellites.

SIGNIFICANCE OF THE LUNIK PROBE

Mr. WEISL. Based upon your long experience, Dr. von Braun, will you tell the committee briefly what you consider the significance of the lunik probe of the Russians, both militarily and from a commercial and civilian viewpoint?

Dr. VON BRAUN. The information that we have on the lunik is partly based on Russian reports and partly on independent confirmation that could be gathered on this side of the Iron Curtain.

The Russians have announced that lunik was fired, I believe, on the 2d of January 1959. They predicted at first that it would pass the moon or reach the vicinity of the moon at 7 a. m. on January 4, 1959.

The Russians also stated that the final stage of this rocket weighs 1,472 kilograms, which is approximately 3,000 pounds, and that the overall weight of the payload itself together with power supply and container—I think what they meant to say was electrical power supply—is 361.3 kilograms, which is approximately 700 pounds.

The Russians have also announced that lunik's transmitters operate on four different frequenices; namely, 19.993, 19.995, 19.997, and 183.6 megacycles.

Our own tracking stations in the United States were not quite prepared to receive and track on these frequencies because they were laid out in support of our own Pioneer space probes, which radio their signals back on 960 megacycles; so as soon as word was received that the Russians had claimed to have fired this Lunik space probe, the NASA Jet Propulsion Laboratory in California modified their Goldstone radar—it is a great big 85-foot radar dish out near Camp Irwin, Calif.—to one of the Lunik frequencies. After several unsuccessful attempts, they finally succeeded in receiving a signal at the predicted 183.6 megacycles on Sunday, January 4, at 2:30 a.m., Pacific standard time.

This signal was received for an extended period of time, and, since such a large radar dish has a capability of determining pretty exactly where a signal comes from, it was obvious that it came from where the Russians said their rocket was by then. The Goldstone dish received those signals approximately at the time when the rocket passed the moon.

I think it did pass the moon at 5:59 a.m. on January 4, and its signal was received at 2:30 a.m., but the 5:59 was Moscow time and 2:30 was Pacific standard time; so it was received approximately at the time when the rocket passed the moon.

Thus, the conclusion on the part of the tracking personnel at JPL is that there was a signal. It was received at the frequency the Russians had predicted. It came from a spot in the sky where the Russians said their rocket was, and the signal received was clear enough so that there was absolutely no doubt left that the signal was there.

CONFIRMATION BY PALOMAR OBSERVATORY

However, due to the improvisations—JPL had to use a commercial TV receiver with their Goldstone dish in order to raise the Lunik frequency—the tracking was not sufficiently sophisticated to determine

whether the rocket was traveling at the speed that the Russians said it did, so it could only be confirmed that it was there.

Now, in addition to this piece of proof, the Palomar Observatory in California actually photographed or at least visually observed Lunik after it had passed the moon. They observed it like an asteroid streaking slowly through the sky.

In addition to this, there is a third confirmation. On January 3, at 3:57 a.m. Moscow time, the Russians predicted that they would release a so-called artificial comet from the Lunik. This was said to be a special device designed to release a sodium cloud and thus convert the rocket visually into something looking like a comet.

In other words, there would be a fluorescent vapor cloud in the sky which the Russians predicted would be visible and could be photographed. This cloud was actually photographed by at least one station in northern England.

So I think there can be no question that the rocket was there and that to the best of our knowledge it performed just as the Russians claimed it did.

In the meantime, on January 12, the Russians published a very detailed report entitled, "Soviet Cosmic Rocket." It appeared in Pravda, and I have here in front of me a translation prepared by the Jet Propulsion Laboratory. It gives an exact description with illustrations as to what the purpose of the exercise was, what measurements were carried out, and what the instrumentation looked like. So far there is no evidence available to cast any doubt on what this report says.

Mr. WEISL. Can we have that to be kept in our files, Dr. von Braun?

Dr. VON BRAUN. Yes, sir. Since it comes straight out of Pravda, it is not exactly classified information.

Senator JOHNSON. It may be kept for the files.

(The translated article referred to is as follows:)

[Pravda, Jan. 12, 1959]

THE SOVIET COSMIC ROCKET

(Translated by J. L. Zygielbaum, California Institute of Technology Jet Propulsion Laboratory)

The Soviet Union successfully launched a cosmic rocket toward the moon on January 2, 1959. For the first time in human history, a man-made missile not only attained but surpassed the second cosmic velocity. The last stage of this rocket, weighing 1472 kg (without fuel), passed near the moon to become the first artificial planet in the solar system.

This event marks a new stage on the road to conquest of cosmic (interplanetary) space. Through the creative efforts of the Soviet people a new heavenly body was born, which has escaped the earth's gravity and circles the sun in an elliptical orbit.

The creation of a cosmic rocket is a natural extension of work in the field of intercontinental missiles and large artificial earth satellites, which is being conducted in the Soviet Union. It is known that the weight of the third Soviet satellite is equal to 1327 kg. This work has made possible the accumulation of the experience necessary for the creation of large and heavy cosmic missiles.

The flight of the rocket through cosmic space has permitted the accomplishment of a series of important scientific experiments on the investigation of interplanetary environment.

For the first time, the possibility of obtaining correct direct measurements over a wide range at such large distances from the earth was realized.

The launching of the cosmic rocket is a new outstanding achievement of Soviet science and technique. For the accomplishment of this flight, a multistage rocket was constructed, which is distinguished by the high quality of its construction, and powerful, highly effective rocket motors. The guidance of the cosmic rocket into its trajectory was accomplished with great precision with the help of special automatic systems.

In order to accomplish the program of scientific experiments, a unique scientific apparatus and special radio measuring systems were constructed. The overall weight of the scientific measuring devices, including the power supply and container which are placed on board the final stage of the cosmic rocket, is equal to 361.3 kg. The trajectory of movement of the rocket in cosmic space was regulated with the help of a complex of radio-technical media, which permitted a reliable determination of the coordinates and velocity of the rocket during each moment of its flight.

The launching of the Soviet cosmic rocket marks the entrance of humanity into an era of interplanetary travel. The subsequent stages on the road to interplanetary travel should be: Further investigation of cosmic space in the solar vicinity, investigation of planets of the solar system, and the flight of a man to another planet.

The scientists, constructors, engineers, technicians, laborers, and inspectors, whose inspiring creative efforts have written a new page in the history of world science and technique, have dedicated the launching of the cosmic rocket to the occasion of the 21st Convention of the Communist Party of the Soviet Union.

The Soviet people appreciate the enormity of the construction program of Communism in our (U. S. S. R.) country, as was indicated in Comrade Khrushchev's speech of the 21st Convention of the Communist Party of the Soviet Union. The realization of this program under the leadership of the Communist Party and the Soviet Government will insure a new and even more vigorous race of the National Economy in our country and will lead the Soviet Nation to the conquest of new heights in all fields of science and technique. Undoubtedly, we shall witness in the coming years new outstanding achievements of our country in the mastery of cosmic space and discovery of new secrets of nature for the welfare of the Soviet people and the whole progressive world.

The high regard of the Central Committee of the Soviet Communist Party and the cabinet of Ministers of U. S. S. R. for the work of scientists, engineers, technicians, and laborers who have created a multistage cosmic rocket and have accomplished its successful launching toward the moon on January 2, 1959, inspires the collectives of scientific investigating institutes, construction offices, factories, and testing organizations to a consolidated effort toward the achievement of new victories in mastering cosmic space.

FLIGHT OF THE COSMIC ROCKET

The cosmic multistage rocket was launched vertically from the earth's surface. Under the influence of a programing mechanism of the automatic system which guides the rocket, its trajectory gradually declined from the vertical. The velocity of the rocket increased rapidly. At the end of the acceleration period, the final stage of the rocket reached the speed necessary for the continuation of its flight. The automatic guidance system of the final stage disconnected the rocket motor and gave the order for the separation of the container with the scientific instrumentation from the final stage. The container and the final rocket stage entered a trajectory and began to travel in the direction of the moon, at a close distance from each other.

In order to escape the earth's gravitation, a cosmic rocket should attain a speed of not less than the second cosmic velocity. The second cosmic velocity, also called the parabolic velocity, is 11.2 km per second near the surface of the earth. This velocity is critical in the sense that at lower so-called elliptical velocities, a body will either become an earth satellite or, after rising to a certain height, it will return to earth. At speeds equal to or faster than the second cosmic velocity (hyperbolic velocity), a body is capable of escaping the earth's gravity and leaving the earth's atmosphere forever.

At the moment when the rocket motor in the final stage was shut off, the Soviet cosmic rocket had already exceeded the second cosmic speed. During its further flight, the rocket is basically influenced by the earth's gravitation until it nears the moon. As a result of this, according to the laws of celestial mechanics, the movement trajectory of the rocket in regard to the center of the earth is very close to a hyperbola, one of whose foci appears to be the earth's

center. The trajectory has its greatest curvature near the earth and straightens out in the course of its escape from the earth. At large distances from the earth, the trajectory becomes almost a straight line.

In the beginning of the rocket's travel along a hyperbolic trajectory, it moves very fast. However, with the increase of distance between the earth and the rocket, its velocity decreases under the influence of the earth's gravitation. Thus, if at an altitude of 1500 km the velocity of the rocket in relation to the earth's center was somewhat more than 10 km/sec, then, at an altitude of 100,000 km, it was only equal to approximately 3.5 km/sec.

The velocity of rotation of the radius vector which links the center of the earth with the rocket decreases, according to the second Kepler law, in an inverse proportion to the square of the distance from the center of the earth. If, in the beginning of travel, this velocity equalled, for instance, 0.07°/sec, it exceeded the angular velocity of a daily revolution of the earth by more than 15 times; then, in approximately 1 hour, it became smaller than the angular velocity of the earth. By the time the rocket has approached the moon, the rotational velocity of its radius vector has decreased more than 2,000 times and is 5 times smaller than the angular velocity of the moon's rotation around the earth. The rotational velocity of the moon is only $\frac{1}{27}$th of the angular velocity of the earth.

These characteristics of the movement of a rocket along a trajectory have determined the character of its transposition in relation to the earth's surface.

On the chart, a projection of the rocket trajectory on the earth's surface plotted against time is reproduced. As long as the rotational velocity of the radius vector of the rocket was great in comparison with the rotational velocity of the earth, this trajectory was moving toward the east with a gradual inclination to the south. After that, the trajectory began to move, at first toward the southwest, and 6 to 7 hours after the start of the rocket, when the rotational velocity had become very small, almost directly west.

In the scheme the rocket's movement among the constellations of the Heavenly realm is shown. The rocket's movement through the Heavenly realm was very uneven—fast in the beginning and slow at the end. After approximately 1 hour's flight through the Heavenly realm the rocket entered the constellation Coma Berenicis. Later, the rocket passed through the constellation Virgo, in which its approach to the moon took place.

On January 3d, 3:57 a.m., Moscow time, when the rocket was located in the constellation Virgo, approximately in the center of the triangle which is formed by the stars Arcturus, Spica, and Alpha-Libra, an artificial comet was created through a special installation on the rocket that discharged a sodium cloud which was illuminated by the sun's rays.

This comet was visible from the earth for several minutes through special optical means. At the moment when the rocket passed the moon, it was located between the stars Spica and Alpha-Libra.

During the approach to the moon, the course of the rocket was inclined toward the course of the moon at approximately 50°. At this moment, the rocket was traveling at a speed approximately 5 times less than that of the moon.

In its rotation around the earth, the moon approached the rocket from the right side, if observed from the northern hemisphere of the earth. The rocket approached this point from the top and right side. At the point of its closest approach, the rocket was above and somewhat to the right of the moon.

The time that it takes the rocket to approach the moon's orbit depends on the excess of its initial velocity above the second cosmic velocity and will be less, the larger that excess becomes. The size of this excess was determined, keeping in mind the facilitation of radio observation of the rocket during its approach to the moon. Radio observation points are distributed on the territory of the Soviet Union, in other European countries, in Africa, and a large part of Asia. It took the rocket 34 hours to reach the vicinity of the moon. At the point of its closest approach, the distance between the rocket and the moon was, according to more accurately defined data, between 5,000 and 6,000 km, that is, approximately 1½ diameters of the moon. When the cosmic rocket approached the moon to a distance of several tens of thousands of kms, the gravitational force of the moon began to show considerable effect on the movement of the rocket. The influence of the moon's gravitation caused the deflection of the direction of the rocket's movement, and it changed the velocity values of its flight in the vicinity of the moon. During the approach, the moon was below the rocket, and therefore, as a result of the moon's gravity, the direction of the

flight of the rocket was deflected downward. The moon's gravity also caused a local increase in velocity. This increase reached its maximum when the rocket was closest to the moon.

After approaching the moon, the rocket continued to move away from the earth; its velocity, in relation to the center of the earth decreased, approaching a value equal to about 2 km/sec.

At a distance of 1 million km, and more, from the earth, the influence of the earth's gravitation on the rocket decreases so much that the movement of the rocket is caused only by the gravitation of the sun. On January 7 or 8, the rocket entered its own orbit around the sun; it became the sun's satellite; it was converted into the first artificial planet of the solar system.

The rocket's velocity in relation to the earth's center during the period of January 7–8 was directed aproximately in the same direction as the velocity of the earth during its movement around the sun. Since the earth's velocity is equal to 30 km/sec, and the velocity of the rocket in relation to the earth equals 2 km/sec, the velocity of movement of the rocket as a planet around the sun was equal to approximately 32 km/sec.

Accurate data on the position of the rocket, direction and magnitude of its velocity at large distances from the earth permit us, according to the laws of celestial mechanics, to consider the movement of the cosmic rocket as a planet of the solar system. The orbit was calculated without taking into account perturbations which might be caused by planets and other bodies of the solar system. The calculated orbit is characterized by the following data: The inclination of the orbit toward the orbital field of the earth is about 1 degree, which is very little; the eccentricity of the orbit of the artificial planet equals 0.148, which is considerably larger than the eccentricity of the earth's orbit, which equals 0.017; the minimum distance from the sun will be about 146 million km, which means that it will be only a few million km less than the distance of the earth from the sun (the mean distance of the earth from the sun is 150 million km); the maximum distance of the artificial planet from the sun would be about 197 million km. That is, the cosmic rocket will be 47 million km farther from the sun than the earth is at this point; the period of rotation of the artificial planet around the sun will be 450 days; that is, about 15 months. The minimum distance from the sun will be reached for the first time in the middle of January 1959, and the maximum in the begininng of September 1959.

It would be of interest to mention that the orbit of the Soviet artificial planet will approach the orbit of Mars at a distance of 15 million km; that is, approximately 4 times closer than the earth.

The distance between the rocket and the earth during the movement around the sun will vary; sometimes it will increase, and sometimes it will decrease. The largest distance between the rocket and the earth might be between 300 and 350 million km.

During the process of circling the sun, the artificial planet and the earth might approach each other at a distance on the order of 1 million km.

THE FINAL STAGE OF THE COSMIC ROCKET AND THE CONTAINER WITH SCIENTIFIC INSTRUMENTATION

The final stage of the cosmic rocket is a controlling rocket, which is fastened to the preceding stage by means of a coupling.

Control of the rocket is accomplished with the help of an automatic system, which stabilizes the position of the rocket on a given trajectory and insures the calculated velocity when the motor ceases to function. After consumption of the fuel supply, the final stage of the rocket weighs 1,472 kg.

Besides the constructions which secure a normal flight of the rocket's final stage, the shell also contains:

A hermetically separated container with scientific and radio-technical instrumentation;

Two transmitters with antennas which work on frequencies 19.997 MC and 19.995 MC;

A cosmic ray counter;

A radio system which makes possible the determination of the flight trajectory of the cosmic rocket and which forecasts its further movement;

A device for the formation of an artificial sodium cloud comet.

The container is located in the upper part of the final stage of the cosmic rocket and is protected from overheating during the rocket's passage through the dense layers of atmosphere by a detachable cone. The container consists

of two spherical thin half-shells, which are hermetically closed by ribs covered with a seal made of special rubber. On one of the half-shells of the container are located 4 antenna rods for a radio transmitter which works on a frequency of 183.6 MC. These antennas are fastened to the body symmetrically in relation to the tapered end of an aluminum shaft, on the end of which is located the transmitting element of an instrument for the measurement of the magnetic field of the earth and for the detection of a magnetic field of the moon. Until the protective cone is ejected, the antennas are folded and fastened to the shaft of the magnetometer. After ejection of the protective cone, the antennas straighten out. Also located on this same half-shell are two proton heads for the detection of gas components of interplanetary matter and two piezoelectrical transmitting elements for the study of meteoric particles.

The half-shells of the container are made of a special aluminum-magnesium alloy. To the ribs of the lower half-shell is fastened the instrument frame, which has a tube-like shape and is made of a magnesium alloy; on it are located the instruments of the container.

Inside the container are located the following instruments:

1. A device for radio control of the movement trajectory of the rocket, consisting of a transmitter which works on the frequency 183.6 MC, and the receiver block.
2. A radio transmitter which works on a frequency of 19.993 MC.
3. A telemetering block which is designed for the transmission of scientific measurement data and also data on temperature and pressure inside the container through the radio systems.
4. Instruments for the study of gas components of interplanetary matter and corpuscular solar radiation.
5. Instruments for the measurement of the magnetic field of the earth and the detection of a magnetic field of the moon.
6. Instruments for the study of meteoric particles.
7. Instruments for the registration of heavy nuclei in the primary cosmic radiations.
8. Instruments for the registration of intensity and intensity variations of cosmic rays and for the registration of photons in cosmic radiation.

The radio and scientific equipments are powered by silver-zinc accumulators and mercury-oxide batteries, which are located on the instrument frame of the container.

The container is filled with gas at a pressure of 1.3 atm. The construction of the container insures the complete insulation of its contents. The internal temperature of the container is kept within the desired limits (about 20° C). The indicated temperature regime is maintained through adding certain radiation-deflecting coefficients to the cover by a special process. Besides, a ventilator is installed in the container, which insures the necessary gas circulation. The gas circulation in the container reduces the temperature of the instrumentation and transfers the excess heat to the shell, which acts as a unique radiator.

The separation of the container from the final rocket stage takes place after the rocket motor installation ceases to operate.

The separation of the container is necessary from the point of view of maintaining the thermal regime of the container. The point is that in the container are located intsruments which radiate a great amount of heat. As was indicated above, the thermal regime is maintained by the preservation of a determinate balance between heat which is radiated by the container shell and heat which the shell absorbs from the sun.

The separation of the container insures a normal operational regime of the antennas of the container and the instrument for measurements of the magnetic field of the earth and the detection of the magnetic field of the moon. As a result of the container separation, the magnetic effects of the rocket's metal construction on the magnetometer readings are removed.

The overall weight of the scientific and measuring instrumentation with the container, together with the power supplies which are located in the final stage of the cosmic rocket, is 361.3 kg.

In honor of the creation of the first cosmic rocket by the Soviet Union, which became an artificial planet of the solar system, two pennants were instsalled in the rocket, carrying the official emblem of the Soviet Union. These pennants are located in the container.

One pennant is made in the form of a thin metallic band. On one side of this band appears the following inscription: "Union of Soviet Socialist Republic," and on the other side are reproduced two emblems of the Soviet Union and the following inscription: "January 1959 January". The inscriptions were made by a special photochemical method, which insures their preservation.

The second pennant contains a spherical form, which symbolizes the artificial planet. The surface of that sphere is covered by pentagonal elements of a special stainless steel. On one side of each element, the following is inscribed: "January 1959" and on the other side the emblem of the Soviet Union and the letters, "USSR."

THE COMPLEX OF MEASURING MEDIA

A large complex of measuring media, distributed over the whole territory of the Soviet Union, was used for the observation of the flight of the cosmic rocket, for the measurement of parameters of its orbit, and for the reception of scientific measurements from the rocket's instrumentation.

The measurement complex consists of the following: A series of automatic radio locating devices, designed for a precise determination of the initial section of the orbit; a series of radio telemetering stations for the registration of scientific information transmitted from the cosmic rocket; a radio-technical system for the control of elements of the rocket trajectory at large distances from the earth; radio-technical stations which were utilized for the reception of signals on the frequencies 19.997, 19.995, and 19.993 MC; optical devices for observation and photography of the artificial comet.

The synchronization of the work of all measuring instruments and the linking of the measurement results to astronomical time were conducted with the help of special devices for simultaneous timing and a radio communication system.

The processing of the data of trajectory measurements which came in from the receiving stations, the determination of orbital elements, and the conveyance of target designations to the measuring instruments were conducted by the coordinating calculation center, with the help of electronic calculators.

Automatic radio locating stations were used for determining the initial conditions of movement of the cosmic rocket, the conveyance of a long-term prognosis on the movement of the rocket, and data of target designations to all measuring and observation devices. The measurement data from these stations were converted into a double code with the help of special problem solving (converters) devices; they were averaged, linked to the astronomical time with an accuracy tolerance of several milliseconds, and automatically released on a communication line. In order to protect the measurement data from possible mistakes during their transmission over communication lines, the measurement information was coded. The application of code made it possible to find and correct one mistake in a transmitted number and to find and discard numbers with two mistakes.

The measurement information which had been converted in this manner was received by a coordinating computation center. Here the measurement data were automatically transferred to perforated cards, with the help of which electronic computers jointly processed the measurement results and orbital calculations. On the basis of a large amount of trajectory measurements and the results of the solution of the extremum problem through the application of the least squares method, the initial conditions of the movements of the cosmic rocket were determined. Furthermore, the system of differential equations was integrated, describing the joint movement of the rocket, moon, earth, and sun.

Telemetering stations on the earth have succeeded in receiving scientific information from the cosmic rocket and registering this information on photographic plates and magnetic tapes. In order to insure a long-distance reception of radio signals, highly sensitive receivers and special antennas with large effective areas were used.

The radio-technical receiving stations operating on the frequencies 19.997, 19.995, and 19.993 MC carried out the reception of radio signals from the cosmic rocket and the registration of these signals on magnetic tape. At the same time, field intensity and a series of other measurements, were conducted which have made it possible to conduct ionospheric investigations.

By means of a change in the manipulation of the transmitter, which operated on two frequencies, 19.997, and 19.995 MC, data on cosmic rays were transmitted. By changing the length of interval between telegraphic messages, basic scientific information was transmitted through the channel of the receiver, which operated on the frequency 19.993 MC.

An artificial sodium comet was constructed in order to make possible optical observations of the cosmic rocket from the earth for the purpose of verification of the passage of the cosmic rocket along a given section of its trajectory. The artificial comet was created on January 3d, 3:37 a.m. Moscow time, at a distance of 113,000 km from the earth. Observation of the artificial comet was possible from parts of Middle Asia, the Caucasus, the Near East, Africa, and India. The artificial comet was photographed with specially built optical instruments, which were placed in the southern astronomical observatories in the Soviet Union. In order to increase the contrast in the photographs, colored films were used which released spectral sodium lines. For the purpose of increasing the sensitivity of the photographic cameras, a series of installations was supplied with electronic optical converters.

In spite of unfavorable weather in most of the regions where optical observation stations were located, we have succeeded in taking several pictures of the sodium comet. The control of the orbit of the cosmic rocket up to a distance of 400,000 to 500,000 km and the measurement of elements of each trajectory were conducted with the help of a special radio-technical system which operated on a frequency of 183.6 MC.

The measurement data were automatically reduced and fixed in code on a special installation, at a precisely determined moment.

As soon as the data were received from the radio-technical system, they were fed automatically to the coordinating computing center. The joint processing of these measurements, together with the measurements of the radio-locating system, permitted a more precise definition of the rocket's orbital elements and direct control of the movement of the rocket in space.

The utilization of powerful transmitters on earth and highly sensitive receivers has insured verified measurements of the trajectory of the cosmic rocket to a distance of 500,000 km.

Application of the above-mentioned complex of measurement media has made possible the reception of valuable data from scientific observation, reliable control, and prognosis of the rocket's movement in cosmic space.

The abundant trajectory measurement data which were gathered during the flight of the first Soviet cosmic rocket and the experience of the automatic processing of trajectory measurements by electronic computers will be of great value in the launching of future cosmic rockets.

SCIENTIFIC INVESTIGATIONS

The Study of Cosmic Rays

One of the most important problems of the scientific investigations which were carried out on the Soviet cosmic rocket is the study of cosmic rays.

The contents and properties of cosmic radiation at large distances from the earth are determined by conditions of origin of the cosmic rays and the structure of cosmic space. Up to the present time, information on cosmic rays was obtained by means of measuring cosmic rays near the earth. Meanwhile, it was discovered that, as a result of the activity of a whole series of processes, the contents and properties of cosmic radiation near the earth differ sharply from those that are inherent in the "actual" cosmic rays. The cosmic rays which can be observed on the earth's surface have very little similarity to those particles which come to us from outer space.

Thanks to the utilization of high-altitude rockets, and especially earth satellites, there is no substantial amount of matter along the path of cosmic rays from outer space to the measuring instrument. However, the earth is surrounded by a magnetic field, which partially reflects cosmic rays. On the other hand, this same magnetic field creates a unique trap for cosmic rays. Once a cosmic ray particle falls into that trap, it will wander around there for a very long time. As a result, a great number of cosmic ray particles have accumulated near the earth.

For the time being, as long as the instrument which measures cosmic radiation is located in the sphere of influence of the earth's magnetic pole, the results of these measurements will be of no help to us in the study of cosmic rays which come to us from outer space. It is known that among the particles which are present at an altitude of 1,000 km, only an insignificant part (about 0.1 percent) comes directly from the cosmos. The remaining 99.9 percent of particles obviously result from the decomposition of neutrons which are emitted by the earth (more correctly, by the upper layers of the earth's atmosphere). These neutrons, in turn, were created by the cosmic rays which bombard the earth.

Only when an instrument can be located, not only outside the earth's atmosphere but outside of the earth's magnetic field, will it be possible to clarify the nature and origin of cosmic rays.

On the Soviet cosmic rocket various instruments are installed, which make it possible to study the contents of cosmic rays thoroughly in interplanetary space.

With the help of two charged-particle computers, the intensity of cosmic radiation was determined. With the help of two photomultipliers with crystals, the contents of cosmic rays were investigated. For this purpose, the following were measured:

1. The flow of energy of cosmic radiation in a wide spectrum of energy.
2. The quantity of photons with energy above 50,000 electron volts (hard X-rays).
3. The quantity of photons with energy above 500,000 electron volts (gamma-rays).
4. The quantity of particles which possess the ability to penetrate a crystal of iodic sodium (energy of such particles exceeds 5,000,000 electron volts.)
5. The composite ionization, which is caused in a crystal by all forms of radiation.

Computers of charged particles have recorded impulses on special so-called recomputing schemes. With the help of such schemes, it is possible to transmit a radio signal when the determined quantity of particles has been calculated.

Photo-multipliers attached to crystals recorded light explosions which occurred inside the crystals during the penetration of cosmic radiation particles. The magnitude of the impulses at the exit of the photo-multiplier is, within known limits, proportional to the quantity of light which was radiated at the moment of penetration of cosmic ray particles inside the crystal. This last magnitude is, in turn, proportional to the energy which was spent in the crystal on the ionization of a cosmic ray particle. The most sensitive system registers all cases, when the energy emanated in the crystal exceeds 50,000 electron-volts. However, the penetration ability of the particles is very small at such energies. Under these conditions, X-rays will be recorded primarily.

Calculation of the amount of impulses is accomplished with the help of the same recomputing schemes which were used for the calculation of the quantity of charged particles.

In an analogous manner, impulses whose magnitude corresponds to the emanation of energy in a crystal above 500,000 electron-volts are separated. Under these conditions, mainly gamma-rays are registered.

By means of impulse-separation of a still larger magnitude (which corresponds to an energy emanation of more than 5,000,000 electron-volts) cases of cross penetration through crystals by cosmic ray particles which possess great energy are defined. It should be noted that charged particles, which are included in the contents of cosmic rays and which travel with the speed of light, will go through crystals. During that process the energy emanation in a crystal will, in most cases, be equal to 20,000,000 electron-volts.

Besides measurements of the number of impulses, the total ionization which is emanated in a crystal by all forms of radiation is determined. For this purpose, a scheme is used which consists of a neon bulb, a condenser, and resistors. This system makes it possible to determine the total current which flows through the photo-multiplier and, by the same token, to measure the total ionization emanated in a crystal by measuring the number of times that the neon lamp lights up.

The investigations which were conducted on the cosmic rocket make it possible to determine the contents of cosmic rays in interplanetary space.

THE STUDY OF GAS COMPONENTS OF INTERPLANETARY MATTER AND CORPUSCULAR SOLAR RADIATION

Until recently, it was assumed that the gas concentration in interplanetary space is very small and is measured by particle units per cubic centimeter. However, some astrophysical observations of the last few years have shattered this point of view.

The pressure of solar rays on particles of the uppermost layers of the earth's atmosphere creates a unique "gas tail" for the earth, which is always directed away from the sun. The luminosity of this "gas tail," which is projected on the astral background of the night sky in the form of a counter-luminescence, is called

the Zodiacal light. In 1953 results of observation of the polarization of the Zodiacal light were published; this led some scientists to the conclusion that in interplanetary space in the region of the earth about 600 to 1,000 free electrons exist per cubic centimeter. If this is true, and since the invironment as a whole is electrically neutral, then it should also contain positively charged particles in a similar concentration. Some of the assumptions made from the polarization measurements indicated a dependence of electronic concentration in interplanetary environment on the distance from the sun and, consequently, also on the density of the gas, which is supposed to be completely or almost completely ionized. The density of interplanetary gas should decrease with the increase in distance from the sun.

Another competent fact which verifies the existence of interplanetary gas with a density of 1,000 particles per cubic centimeter appears to be the propagation of the so-called "hissing atmospherics," that is, low frequency electro-magnetic oscillation which is caused by atmospheric electrical discharges. In order to explain the propagation of these electro-magnetic oscillations from the place of their origin to the point where they are observed, we shall have to assume that they are propagated along the power lines of the magnetic field of the earth, at a distance of 8–10 earth radii (that is, 50,000 to 65,000 km) from the earth's surface, in an environment with an electronic concentration of 1,000 electrons per cubic centimeter.

However, the conclusions on the existence of such a dense gas environment in interplanetary space are by no means indisputable. Thus, a group of scientists has indicated the fact that observed polarization of the Zodiacal light may be caused, not by free electrons, but by interplanetary dust. An assumption was expressed that in interplanetary space, gas is present only in the form of so-called corpuscular currents, that is, currents of ionized gas which emanated from the sun's surface and travel with a velocity of 1,000 to 3,000 km/sec.

Obviously, at the present stage of astrophysics the question of the nature and concentration of interplanetary gas cannot be solved by means of observations conducted from the earth's surface. This problem, which is of great value in the clarification of the processes of gas exchange between interplanetary environment and the upper layers of the earth's atmosphere, and for the study of conditions of propagation of corpuscular solar radiation, might be solved with the help of instruments installed on rockets which travel directly in interplanetary space.

The purpose of installing instruments for the study of gas components of interplanetary matter and corpuscular solar radiation on the Soviet cosmic rocket is to conduct the first stage of similar investigations, i.e., attempts at direct detection of stationary gas and corpuscular currents in the realm of interplanetary space between the earth and the moon and the rough evaluation of the concentration of charged particles in this region. During the preparation of this experiment on the basis of available data, two examples of interplanetary gas environment were accepted as probable:

(*a*) There is in existence a stationary gas environment which consists basically of ionized hydrogen (that is, of electrons and protons of hydrogen nuclei) with an electronic temperature of 5,000 to 10,000° K (which is close to ionic temperature). At times, corpuscular currents pass through this environment with a velocity of 1,000 to 3,000 km/sec and with a concentration of particles of 1 to 10 per cubic centimeter.

(*b*) There are in existence only sporadic corpuscular currents which consist of electrons and protons with velocities of 1,000 to 3,000 km/sec, which sometimes attain a maximum concentration of 1,000 particles per cubic centimeter.

The experiment is conducted with the help of proton traps. Each proton trap represents a system of 3 concentrically located semispheric electrodes with radii of 60 mm, 22.5 mm, and 20 mm. Two external electrodes are prepared from thin metallic screens: the third, which is a continuous electrode, serves as a proton collector. The electrical potential of the electrodes in relation to the body of the container is such that the electrical field which is formed between the electrodes of the trap should insure a complete collection of all protons and the ejection of electrons which fall into the trap from stationary gas, as well as the suppression of the photo current from the collector, which is formed under the influence of ultra violet solar radiation and other radiations which affect the collector.

The separation of the proton current which is created in the traps by stationary ionized gas and corpuscular currents (if they exist together) is realized by the simultaneous utilization of four proton traps, which differ from each other

by the fact that two of them have on their covers (internal screens) a positive potential which equals 15 volts in relation to the cover of the container. This braking potential prevents the stationary gas protons (which possess an energy of one electron volt) from falling into the trap, but it cannot prevent the corpuscular protons, which possess much greater energies, from falling into the collector. The two remaining traps should register the total of proton currents which are created by stationary as well as corpuscular protons. The external screen of one of the traps is located under the potential of the container cover, and the other has a negative potential which equals 10 volts in relation to that same cover. The current in the circuits of the collectors after intensification is recorded with the help of a radio-telemetering system.

INVESTIGATION OF METEORIC PARTICLES

Side by side with the planets and their satellites, asteroids and comets, large amounts of fine solid particles are present in the solar system, which travel in relation to the earth at velocities of 12 to 72 km/sec and are called meteoric matter.

At the present time, the basic information about meteoric matter which penetrates the earth's atmosphere from interplantetary space is obtained by astronomical and also radio-locating means.

Comparatively heavy meteoric bodies, which enter the earth's atmosphere at great velocity, burn up, causing a radiance which is observed with the naked eye and also with the help of telescopes. Smaller particles are detected and tracked with the help of radio locaters by the wake of charged particles—electrons and ions, which are created during the movement of a meteoric body.

On the basis of these investigations data were obtained on the density and velocity of meteoric bodies with a mass of 10^{-4} or more near the earth.

Data on fine and numerous particles with diameters of several microns can be obtained through observation of the propagation of solar light only on a great accumulation of such particles. The investigation of individual micrometeoric particles is possible only with the help of instruments installed on artificial earth satellites, and also on high-altitude cosmic rockets.

The study of meteoric matter is of substantial scientific value in geophysics and astronomy, for the solution of problems of the evolution and origin of the planet systems.

In connection with the development of rocket technique in the beginning of the era of interplanetary travel, which began with the first Soviet cosmic rocket, the study of meteoric matter becomes of great practical interest for the determination of meteoric security for cosmic rockets and artificial earth satellites which remain in flight for long periods of time.

During collisions with rockets, meteoric bodies are capable of affecting them variously: They might destroy them or they might damage their hermetic chambers by penetrating the cover. Micrometeoric particles, after bombarding the rocket cover for a long period of time, might cause a change in the character of its surface. The surface of optical instruments may change from transparency to translucence as a result of collisions with micrometeoric bodies.

As is known, the probability of collisions of a cosmic rocket with meteoric particles which are capable of damaging it is very small, but it exists, and it is important to evaluate it properly.

For the investigation of meteoric matter and interplanteary space two ballistic piezo-electrical transmitting elements of ammonium phosphate which register the collisions with micrometeoric particles were installed on the instrument container of the cosmic rocket. The piezo-electrical transmitting elements convert the mechanical energy or particle collisions into an electrical energy, the value of which depends on the mass and velocity of the colliding particle, and the number of impulses equals the number of particles which hit the surface of the transmitting element.

Electrical impulses from the transmitting element, which are in the form of short-lived oscillations, are fed into an amplifier-converter which divides them into three ranges according to amplitude and computes the number of impulses in each amplitude range.

MAGNETIC MEASUREMENTS

The successes of the Soviet rocket technique open great possibilities for geophysicists. Cosmic rockets make it possible to conduct direct measurements of the magnetic fields of planets with special magnetometers or to detect the fields

of planets, thanks to their possible influence on the intensity of cosmic radiation, and the immediate space which surrounds the planets.

The flight of the Soviet cosmic rocket, which is armed with a magnetometer, in the direction of the moon, appears to be the first such experiment.

Besides the investigation of magnetic fields of cosmic bodies, the question of the intensity of the magnetic field in cosmic space in general is of tremendous significance. The intensity of the earth's magnetic pole at a distance of 60 earth radii (at a distance of the lunar orbit) is practically zero. There is a foundation for the assumption that the magnetic movement of the moon is small. The magnetic field of the moon, in case of an homogeneous magnetization, should decrease according to the law of the cube of distance from its center. In the case of heterogeneous magnetization, the intensity of the lunar field will decrease even faster. Consequently, it can be reliably discovered only in the immediate proximity of the moon.

What is the intensity of a field in space inside the moon's orbit at a sufficient distance from the earth and moon? Is this intensity determined by values which are calculated from the magnetic potential of the earth, or does it depend on other causes? The magnetic field of the earth was measured by the 3d Soviet satellite in a range of altitudes of 230 to 1800 km, that is, to one-third of the earth's radius. A relative deposit of a possible non-potential part of a constant magnetic field, of a variable part of the magnetic field will be larger at a distance of several earth radii where the intensity of its field is already sufficiently small. At a distance of 5 radii, the field of the earth should amount to approximately 400 gammas (one gamma equals 10^{-5} oersted).

Installation of a magnetometer on the rocket which flew in the direction of the moon was made for the following purposes:

1. To measure the magnetic field of the earth and possible fields of such systems in space inside the lunar orbit.
2. To detect the magnetic field of the moon.

The question of whether the planets of the solar system and their satellites are magnetized similarly to the earth appears to be of great importance in astronomy and geophysics.

The statistical processing of a great number of observations, which were conducted by magnetologists for the purpose of detection of a magnetic field on the planets and the moon by the possible influence on the geometry of corpuscular currents which emanate from the sun, did not bring any concrete results.

Attempts to establish a general relationship between the mechanical moments of cosmic bodies, which are known for the majority of planets of the solar system, and their possible magnetic moments, have not found any experimental confirmation in a whole series of experiments on earth, which have followed this hypothesis.

In various hypotheses on the origin of the magnetic field of the earth, an example of regular currents which flow in the liquid-conducting nucleus of the earth and which cause the basic magnetic field of the earth is at present used most often.

Thus, according to this hypothesis, the existence of a liquid-conducting nucleus appears to be a necessary condition for the presence of a general magnetic field.

We know very little about the physical contents of the internal layers of the moon. It was assumed until recently, based on the shape of the moon's surface, that if the mountains and lunar craters are of a volcanic origin, the volcanic activity of the moon has ceased long ago, and it is uncertain whether the moon has a liquid core. According to this point of view, it should be assumed that the moon does not possess a magnetic field, if the hypothesis about the origin of the earth's magnetic field is true. However, if the volcanic activity on the moon continues, then there is a possibility of an existing heterogeneous magnetization of the moon and even a general homogeneous magnetization.

The sensitivity, the measuring range of the magnetometer, and the program for its work for the Soviet cosmic rocket were chosen on the basis of the need for the solution of the above-indicated problems. Since the orientation of the measurement-transmitting elements in relation to the measured magnetic field varies constantly because of the rotation of the container and the earth's rotation, a three-component magnetometer of a full vector with magnetically absorbed transmitting elements was used. Three reciprocally perpendicular sensitive transmitting elements of the magnetometer are fastened in a stationary manner in relation to the body of the container on a special anti-magnetic rod with a length of more than 1 meter. With this apparatus, the influence of magnetic particles of the container's instrumentation is still between 50 and 100

gamma, depending on the orientation of the transmitting elements. Sufficiently accurate results from the measurements of the magnetic field of the earth may be obtained to a distance of 4 to 5 of its radii.

The scientific instrumentation which is located on the rocket has functioned normally. A great quantity of data on the measurement results was received and is being processed now. Preliminary analysis shows that the results of the investigation are of tremendous scientific value. These results will be made public as soon as the processing is completed.

THE ARTIFICIAL SODIUM COMET AND THE INSTRUMENTATION FOR ITS CREATION

The artificial sodium comet represents a cloud of sodium vapors in an atomized state, which is discharged into cosmic space from the rocket at a predetermined moment. The illumination of the sodium cloud takes place as a result of resonant fluorescence. The nature of this appearance is a result of the fact that the atoms of sodium disperse the solar light in a narrow interval of frequencies in the yellow part of the solar spectrum.

The light which was dispersed by the solium cloud is nonochromatic, which makes it possible to obscure the background of the sky to a considerable degree for observation of the clouds through special light filters.

The brightness of the sodium cloud, which consists of 1 kg of sodium and was created at a distance of 113,000 km from the earth, should be, according to calculations, equal to the sixth astral magnitude, which makes possible observation of the cloud through the naked eye. For comparison, we should indicate that the brightness of the cosmic rocket itself during its flight at this distance is equal to approximately the 14th astral magnitude.

Consequently, the creation of an artificial sodium comet makes it possible to accomplish optical observations from the earth of a specific point on the trajectory of a cosmic rocket.

Observation of the sodium comet is possible only at night. This circumstance determines the time and point of the creation of the sodium cloud during the flight of the cosmic rocket. The time of formation of the artificial comet was calculated so that it would be visible by as great a number of observation stations in the Soviet Union as possible. For the creation of an artificial sodium comet, a special instrumentation was used, which was installed on the final stage of the cosmic rocket. The basic unit of this instrumentation is the sodium vaporizer. The construction of this vaporizer makes it possible to accomplish the vaporization of 1 kg of sodium in a period of 5–7 seconds and to eject this sodium cloud under the conditions of weightlessness and deep vacuum of cosmic space.

The order which was necessary for the operation of the vaporizer at a strictly predetermined moment is given through a miniature electronic commanding device, the basis of which is a quartz timer.

The successful launching of the Soviet cosmic rocket in the direction of the moon, and the creation of the first artificial planet, is the most outstanding achievement of Soviet science and technique. The time is not far away when through the cosmic trails, interplanetary ships will travel to the most distant corners of the solar system; the beginning of this time is marked by the launching of the cosmic rocket. Humanity has entered an era of direct penetration into the universe.

Mr. WEISL. Dr. von Braun, will you kindly tell the committee the military and other significance of this Lunik probe? What does it mean as to the capability of the Russians on propulsion, on guidance, and so forth?

Dr. VON BRAUN. I think there is a consensus of opinion among rocketeers in this country that it just proves again that the Russians have a multistage rocket available with a substantialy higher initial thrust than anything we have fired so far in this country.

The chances are that the first stage of Lunik was the same that they used for Sputnik III, but that they put an additional third stage on top of their two-stage Sputnik III rocket. This third stage gave them the final velocity to shoot the rocket out of the Earth's gravitational field and into an orbit around the Sun.

RUSSIANS PREDICT LUNIK WILL CROSS ORBIT OF MARS IN MAY

I would like to mention in this context that I just happened to run into an issue of the Army Times dated January 31—which is tomorrow—which says:

Preliminary calculations just finished in Moscow indicate that Lunik at perihelion will be 214.75 million miles from the Sun. This is far beyond the orbit of the planet Mars. Mars approaches the Sun to within 128 million miles at its perihelion and can go as far as 154 million miles. Lunik will go much farther than that. It should cross the orbit of Mars in May.

The article further indicates that this higher speed came as a surprise even to the Russians. I think we are in no position today to either confirm or deny these new figures, but it is a fact that the rocket passed the Moon approximately 1 hour earlier than the Russians themselves had predicted it would. This would indicate that at power cutoff it had a speed slightly higher than planned. If the speed was—as one of the Russian reports says—still 2.45 kilometers per second when the rocket left the gravitational field of the Earth, it is likely that this much wider orbit around the Sun was obtained. In other words, I consider it entirely possible that the remotest point of Lunik's orbit around the Sun lies beyond the orbit of Mars.

Mr. WEISL. What does this indicate as to the efficiency and precision of the guidance ability of the Russians?

Dr. VON BRAUN. You need a very substantial accuracy to do this kind of thing. They succeeded in shooting Lunik only a few Moon radii past the Moon. That means they must have a very precise guidance system.

Mr. WEISL. And how does this type of guidance compare with the type of guidance you need to launch successfully an ICBM?

Dr. VON BRAUN. The guidance requirements for an ICBM are definitely more stringent than a few Moon radii. On the other hand, there are a number of additional factors affecting the dispersion of a rocket aimed at the Moon.

For example, if the rocket does not take off exactly at the predetermined time, you can have a very accurate guidance system, but still miss the Moon. For the Moon travels through its orbit at a considerable speed, and the Earth rotates about its axis along with the ground station from which you fire.

Thus a timing error can also lead to a target deviation of a rocket aimed at the Moon. Unless we know exactly what kind of a scheme the Russians used in their guidance system, in particular whether or not they tried to compensate for any slight timing errors—it would be more correct to say whether they cared to compensate for them—it is hard to say whether Lunik's guidance system could have done better than a few Moon radii error.

DR. VON BRAUN CONVINCED OF QUALITY OF RUSSIANS' GUIDANCE SYSTEM

I am convinced that the Russians are only too well aware of what it takes to hit, say, a city or an important installation over intercontinental distances, and I am equally sure that Lunik proves that they have a guidance system that can do just that.

Mr. WEISL. You have made a study and have experience in our own capabilities and progress in the missile field, and you have studied

intelligence reports and other things with reference to the Russian capability and progress.

Would you say in the space field that we are ahead or behind or equal with the Russians at the present time?

Dr. VON BRAUN. I am convinced we are behind.

Mr. WEISL. How far behind would you say that we are, in your opinion?

Dr. VON BRAUN. Well, sir, I think it all depends on how we define our time lag.

Mr. WEISL. You state it in your own way to give this committee some idea of where we stand. I know no one can say exactly in point of time.

Dr. VON BRAUN. Sir, let's put it this way. If the Russians completely stopped working today, and we continued full blast with our present program, we could probably catch up with them within a year or less, maybe within three-quarters of a year. But there is no indication that they are stopping. In fact, the question is: "Are we working as fast as they? Is the gap growing or is the gap really getting smaller?"

Mr. WEISL. What would you say: Is the gap growing or getting smaller?

Dr. VON BRAUN. I think a year ago it was certainly growing fast. It is hard to appraise whether we have caught up with their working speed and whether the gap is now stationary or is getting gradually smaller. Certainly there is still a gap. But it is very difficult to say when we will have caught up with them, because in order to predict that you have to know the other fellow's working speed.

Mr. WEISL. Would you care to give the committee some recommendations as to what we ought to be doing that we are not doing now to close that gap as quickly as we can?

Dr. VON BRAUN. I am convinced that in the space area more money could be spent and could be intelligently spent, and faster progress could be attained if more money was available.

I do not believe that this statement applies to the remaining development work in the ICBM and IRBM areas, at least as far as the first-generation ICBM's and IRBM's are concerned. I think in these areas we are working as fast as we can, at least in the remaining development.

This has nothing to do with the question whether we could not and should not produce more ICBM's and IRBM's. But in the space area we could definitely speed up our development if more money was available.

Mr. WEISL. What part do you have in the space development field in your work with the Army?

MORE MONEY WOULD SPEED 1.5-MILLION-POUND-THRUST BOOSTER UNIT

Dr. VON BRAUN. As Mr. Roy Johnson pointed out in his previous testimony, we have among other things a development assignment from ARPA to develop a 1.5-million-pound-thrust booster unit using a cluster of existing rocket engines.

ARPA has supported this project financially to the limit of their ability, but more money would definitely speed it up. It would permit us to buy more hardware, to subject all the vital components to

more thorough testing, and therefore come up sooner with a reliable booster.

Right now, financially, the situation is such that only a small portion of our limited funds can be used to purchase a bare minimum of components for ground testing, because the bulk of the funds must go into the boosters that are already scheduled for flight tests. But we could greatly speed up the development if more hardware, more component parts, were available for thorough ground testing in the present, early development phase. Such component testing buys assurance that there will be fewer setbacks later on.

Mr. WEISL. What other recommendations would you care to make which would tend to accelerate our activity in the space age?

Dr. VON BRAUN. I am again referring to this 1.5-million-pound cluster booster that ARPA asigned to us at ABMA.

We would find it most helpful if we could spend an additional $40 million in fiscal year 1959, and an additional $100 million in fiscal 1960 on this one project.

Mr. WEISL. What would that do?

Dr. VON BRAUN. As I said, it would give this country an earlier capability to build real space vehicles with twice or more of the initial thrust that the Russians have demonstrated in their Lunik rocket.

Mr. WEISL. Has the satellite any military significance?

Dr. VON BRAUN. Yes, sir. Quite a few. It was actually a military application that induced ARPA to give us this big booster assignment.

Mr. WEISL. Will you please tell us within security limits what military application the satellite has?

Dr. VON BRAUN. The immediate military objective of this booster project at the moment is to serve as a carrier for a large communications satellite. The purpose is to provide an adequate worldwide military communications link for the Army, the Navy, and the Air Force. To provide better communications for the Strategic Air Command, for the submarine command, and for worldwide Army command channels and local tactical Army commands.

Mr. WEISL. Is it possible to drop a hydrogen bomb on a target from a satellite?

Dr. VON BRAUN. In princinple, yes. I think it would require a manned launching vehicle in an orbit. It would also be better not to talk about "dropping a bomb" but about launching a guided missile back into the atmosphere and guiding it all the way down to a target on the surface of the earth.

Mr. WEISL. Are there any other suggestions that you could make which would tend to speed up our activity in space, generally?

Dr. VON BRAUN. I think more money is the most important suggestion I could make.

BASIC RESEARCH IS NEGLECTED ON NATIONWIDE BASIS

Mr. WEISL. Do we need more basic research?

Dr. VON BRAUN. Yes, sir. More basic and supporting research may not produce an immediate payoff in our country's space capability, say, next year or in 1961, but it is an area that in my opinion is badly neglected. That will hurt us in the long haul. I would say this is a national problem which is by no means limited to the area of defense.

I think so much development and engineering has gone on in recent years in new areas—missiles is only one of these areas—that it seems we have reached the point where the tank of our fundamental knowledge in the natural sciences is getting pretty empty, and very few people really bother about ever refilling that tank.

Everybody takes out of that reservoir what he can find, but the efforts in the basic and supporting research to refill that vat of knowledge, in my opinion, are utterly inadequate.

Mr. WEISL. You heard the statement that Chairman Johnson read from Dr. Waterman's letter to the President. Do you agree with the contents of that statement?

Dr. VON BRAUN. Every word of it; yes, sir.

Mr. WEISL. That we are falling behind in science and technology, not only behind Russia but possibly behind Red China, Japan, and Germany?

Dr. VON BRAUN. Yes, sir. I agree with every word of that letter.

Mr. WEISL. Have you any suggestions as to what can be done to prevent such a situation from happening? You do agree unless we develop science and technology in competition with the Russians and with others, we will just become a second-rate nation in time? Do you agree with that?

Dr. VON BRAUN. Yes, sir. My personal experience has always been this: Whenever we make a proposal to develop a missile system and the proposal is accepted, it is usually funded according to the immediate needs of that program. But, no sooner have the moneys been made available, than there is talk about a firing schedule and a deployment schedule and, by the time all the program details have been clarified, there is no money left for supporting research. The immediate hardware needs are always considered more important. And yet, the development of a typical, large guided-missile system costs several hundred million dollars.

But when we make a plea for some money for supporting research, and we finally succeed in getting a million here or a million there, some people almost act as though they are doing us a personal favor by giving us some research money. Now I feel it is an ethical obligation to put some knowledge back into that tank.

It is very much like farming. You cannot afford to say, "I use all my crop to make a profit."

YOU HAVE TO THINK OF NEXT YEAR'S HARVEST

You have to retain a portion and plow it back under for seed for next year, and you must spend some of your profit on fertilizer.

But very few people feel a responsibility for spending money on fertilizer in the missile and space field, and we are just eroding the soil of our basic knowledge, and very, very little is done about replenishing it.

Mr. WEISL. You heard the testimony of the other competent and fine gentlemen who testified before you.

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. Have you any comment to make or anything to add to that or any suggestions to give?

Dr. VON BRAUN. I would like to make an observation here about this apparent overlap in the organizational area.

I think an organization that is adequate for today's problems may not necessarily be adequate for tomorrow's problems. Today all our space programs are actually based on the fundamental need to apply existing military missile hardware to new objectives in space.

Now, since the missile projects applicable to space missions existed already within the services, mainly within the Air Force or the Army, and since there are continued operational needs and production needs for these missiles, it is only natural that the services continue to have a great stake in these missile programs.

On the other hand, the only way to get an active space program going at this time is by pulling some of that missile hardware out and putting it to use for space missions. But, since this missile hardware comes out of the resources developed by the services, there is a need for a top-level organization in the Department of Defense to coordinate all this. This organization is ARPA.

Therefore, the question, "Can Mr. Johnson override the Secretary of the Air Force?" actually is not too meaningful, in my opinion. What he does, essentially, is that he uses the Air Force or the Army or the Navy resources for his defense space projects. These resources supply him with rocket carriers which emerged from existing military missile programs.

Now, I think this present setup is quite adequate as long as we are concerned with the first generation of space vehicles. During the first generation of space vehicles our national program rides, more or less, on the coattails of our military missile programs.

But very soon there will be a second generation space program where this is no longer the case, where substantial amounts of money must be spent to develop space vehicles which are no longer a fallout of the missile program, and at that time the problem changes.

BOOSTER A SECOND GENERATION EFFORT

Mr. WEISL. When should we begin on that program?

Dr. VON BRAUN. Well, in a way, we have entered it already with the 1½-million-pound thrust booster that we are presently developing. It is actually the first of these second-generation space vehicles that are not a fallout of a missile program. It is a thing in itself, and developed solely for space missions, both military and scientific.

Mr. WEISL. There is a space missile engine of a million-pound thrust being developed by NASA, a single-thrust engine; isn't that true?

Dr. von BRAUN. Yes, sir.

Mr. WEISL. And your development, I understood, was for military purposes and not for space purposes.

NEGOTIATIONS UNDERWAY FOR JOINT USE OF BOOSTER

Dr. VON BRAUN. Yes, sir; that is the immediate objective. But there are negotiations underway between NASA and ARPA about NASA joining this effort so that our large booster could be used by both military and scientific objectives.

Mr. WEISL. And what is the status of those negotiations now, if you know?

Dr. VON BRAUN. From what I know unofficially, the intention exists within NASA to go along with this. In other words, to join forces with ARPA and add additional funds out of NASA's budget to our 1½-million-pound booster with a cluster of existing engines.

Mr. WEISL. What other effort should we be making now in research and in money to see that we are ahead in space in the future?

Dr. VON BRAUN. The space programs require system studies at the very beginning. For example, it does not make too much sense to just build a big booster and demonstrate our capability to orbit a load of 20,000 to 30,000 pounds, and only then to start thinking of how to use such a payload capability.

It is necessary to plan right now what payloads, what techniques to use, and what such heavy satellites or space probes should be used for. For example, with this big 1½-million-pound booster, it would be possible to land a very elaborate automatic radio station on the moon that could automatically radio back information about the surface conditions on the moon.

Well, to develop such a self-sustained unit capable of unattended operation under the environmental condition on the moon, requires time also, and one would have to start its development right now to have it available by the time the carrier rocket itself is around.

In other words, although we are not talking about weapons here, it would be desirable to investigate some of these problems very much like it is customary in the investigation of weapons systems. It would be a "lunar transportation system" in this case.

JURISDICTIONAL PROBLEMS INHERENT IN DUAL USES

Mr. WEISL. What organizational problem do you see in the future, based upon your experiences of the past? By that I mean the jurisdictional questions as to what is military and what is civilian, what belongs to this agency and what belongs to that agency. You have had considerable experience in the past. What can we do now to prevent those same things from arising in the future?

Dr. VON BRAUN. I think in the technical area there is a very fundamental difficulty to distinguish between civilian space and military space. At least as far as the equipment needs are concerned.

Take a communications satellite, for example. It certainly concerns the services and the services will definitely need it.

But, at the same time, once it works, you can also use it as a civilian communications link. So you have a whole family of problems, and even of components, here that will emerge from this development and can be used both by the military and by commercial interests.

Mr. WEISL. When you testified here a year ago, Dr. von Braun, you pointed out it took you months and sometimes years to get a decision, and then when you got a decision to go ahead you could not get the check. Has that situation changed any?

Dr. VON BRAUN. Yes, sir; we get the decisions quicker now. There is no question about it.

Mr. WEISL. You get them quicker now?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. And you think ARPA is working very well?

Dr. VON BRAUN. Yes; our cooperation with ARPA is highly satisfactory, and with NASA also, and in areas where NASA and ARPA should coordinate between themselves, they usually do so.

Mr. WEISL. What about the checks?

FUNDING STILL INSUFFICIENT, SAYS DR. VON BRAUN

Dr. VON BRAUN. Well, the money comes, but it is too little.

Mr. WEISL. My time is up, Mr. Chairman.

Senator JOHNSON. Dr. von Braun, I want to thank you not only for appearing here today, but for your frankness and especially for your contributions to our country's space program.

We will never forget your indispensable assistance relative to the development of Explorer I, our first successful satellite. Your recommendations to this committee when we had you as a witness before our final report were very, very helpful, and I think you made a great contribution to the advancement we have made since you testified here last time.

I want, on behalf of the committee, to express our deep appreciation for the very high type service you have rendered this Nation.

Dr. VON BRAUN. Thank you, Mr. Chairman.

Senator JOHNSON. Senator Stennis?

Senator STENNIS. Mr. Chairman, I want to be sure that we get the information here.

Doctor, you were talking about a needed or added $40 million for the current fiscal year 1959, $50 million for the current budget. What uses were you discussing when you mentioned that figure?

Dr. VON BRAUN. This referred very specifically to the large 1½-million-pound thrust booster using a cluster of existing rocket engines that we have under active development at ABMA in Huntsville.

I was saying that with an additional $40 million in fiscal 1959, and an additional $100 million in fiscal 1960, we could substantially accelerate this program.

Senator STENNIS. Each of those items was for this booster?

Dr. VON BRAUN. Yes.

Senator STENNIS. In round numbers, generally, there is something above $4 billion in the current military budget for research and development, including the development.

I do not attempt to state those accurately, but it is between 4 and 5 billion dollars. Could you give us some idea as to how it is these necessary funds that you mentioned there, the $40 million, does not get on down to you?

Dr. VON BRAUN. Well, sir, fortunately, I am not in the difficult predicament to have to distribute the money which the Department of Defense gets as a whole, and to decide what development project is more important than another. All I can say from where I sit is that we could produce results faster with this large booster if we had more money.

Whether that money can be found, whether it can be taken away from some other programs or if the taxpayers should pay higher taxes to get it, this is strictly beyond me.

Senator STENNIS. I was referring to the money that is already appropriated, why it does not get down to you, but that is really out of your category.

I remember you used the expression here a little over a year ago that with reference to some of your projects, they went all right for a time and then the termites got into them. Now you seem to have been able to clear up most of those termites; is that right?

Dr. VON BRAUN. Yes, sir. But I must say the sputniks have helped a great deal to drive the termites out.

Senator STENNIS. May I add to what Senator Johnson said. Your testimony here before this subcommittee more than 13 months ago was very valuable indeed, and one thing that it did, it led directly to my decision that it was my duty to try to go over to Russia and take a look and get an impression at least, which I did do; and I did not come back with any answers, but I certainly realize the problem more in line with what you said and what the letter which has been quoted here said, too.

Mr. Chairman, that is all I have now.

Senator JOHNSON. Thank you, Senator Stennis.

Senator Symington?

CONGRATULATIONS ON ORBITING OF EXPLORER I

Senator SYMINGTON. Dr. von Braun, I would like to join Senator Johnson in congratulating you on the orbiting of Explorer I. That was the finest thing, I believe, that has been done in some time.

Dr. VON BRAUN. Thank you, sir.

Senator SYMINGTON. In 1955, as you remember, I protested to the Secretary of the Army and to the Chiefs of Staff about some optimistic statements that you made, and later on I think you said that the reason they were made was because you were not allowed certain classified papers; isn't that correct?

Dr. VON BRAUN. That is correct, Senator.

Senator SYMINGTON. Don't you think the more the people know about these situations, the more accurate information they get, the greater chance we have of working out these problems?

Dr. VON BRAUN. Most certainly. Yes, sir.

Senator SYMINGTON. Do you agree to that?

Dr. VON BRAUN. Yes, sir.

Senator SYMINGTON. Thank you, Doctor.

Now, in a broadcast on December 7 last, on the "Meet the Press" program, Mr. Spivak said:

Dr. von Braun, earlier this year, you were quoted as saying that it would take the United States 5 years to catch up with the Soviet Union in rocketry. Were you correctly quoted on that?

And you replied, "Yes."

Do you still feel that way about it?

Dr. VON BRAUN. Yes, sir.

Senator SYMINGTON. And on page 16, Mr. Corddry asked you:

Dr. von Braun, could we analyze your statement again about how much ahead of us the Russians might be? I gather you don't any longer think they are 5 years ahead of us.

And you said,

I didn't say that. I didn't say that.

Mr. CORDDRY. Do you think they are 5 years ahead of us?

You said,

I believe they are in the ballistic missiles area, in possession of certain hardware that we either don't have yet or haven't tested yet to the extent that they have.

Mr. CORDDRY. Let's take it this way. Do they have a missile of equivalent range and accuracy to the Thor or Jupiter tactically deployed?

You said,

I am in no position to comment on this, but there is some information available, of course, on what they do have. I would say that information is not exactly comforting.

Mr. CORDDRY. Well, the statements that have been made officially are that they have operational missiles in the 800-mile range class, which is about half the range of a Thor-Jupiter, and I thought you would perhaps give your view of whether that is inaccurate.

You say,

I can neither confirm nor deny this, but maybe you ought to bear in mind that in appraising the Russian missile arsenal, you should look at their tactical needs. Now, their targets are either, say, European targets or they are targets in this country, and this would govern their requirements, and, for that reason you should not necessarily conclude that if they had something that we don't have, or vice versa, that this would in any effect determine the balance between the military stature between the two countries. Their needs might be quite different.

Now we have not been able to obtain testimony for some reason what the IRBM situation is with respect to missiles, say missiles between 700 miles and 1,500 miles.

How many ballistic missiles do you think that the Russians have, within those ranges, just your own personal guess?

DEPLOYMENT OF RUSSIAN IRBM ESTABLISHED

Dr. VON BRAUN. Sir, I know practically nothing about the production figures, but I think it is established that they have deployed these units, and, in a way, it does not take so very many of this kind of missiles to create a formidable threat.

What I meant with this particular statement was the following: The Russians, have a different geographical problem from their point of view. In my opinion, they could very actively use even medium-range missiles of only several hundred miles' range to blackmail our NATO allies.

Senator SYMINGTON. Actually based on optimistic countdowns, we hope to have, if they had hundreds of these missiles and they decided to launch them, it would be very difficult for us to get missiles off in retaliation over there, would it not?

Dr. VON BRAUN. Yes, sir.

Senator SYMINGTON. Haven't they, in your opinion, hundreds of these missiles in the 500 miles and-up range?

Dr. VON BRAUN. I think so; yes, sir.

Senator SYMINGTON. Thank you very much. We have had difficulty having anybody declare how many IRBM's they have, although a number of people have been willing to give what I consider to be inaccurate details on the ICBM.

You said that you agreed with what the chairman put in the record about the letter of Dr. Waterman. You said, I think, that you agreed with every word of it.

Dr. VON BRAUN. Yes, sir.

Senator SYMINGTON. What you are really saying is that if we do not get moving, we are going to be in very serious trouble. Is that correct?

Dr. VON BRAUN. Precisely, sir. Yes.

Senator SYMINGTON. If we nevertheless disregard your recommendation and your advice, based on your vast experience in this field, how long do you think it will be before our situation will be so serious that it might be hopeless?

Dr. VON BRAUN. I think there is no time to lose in this area. I think we should really realize that this Russian threat goes far beyond ballistic missiles and stature of the Armed Forces, it goes into the educational programs and everything.

OUR SITUATION WILL BE HOPELESS WITHIN A DECADE UNLESS WE CHANGE ATTITUDE

Senator SYMINGTON. Let me put it to you this way, then: If we do not change our national approach to this problem, as you see it now, how soon will it be before our situation in your opinion is hopeless?

Dr. VON BRAUN. Well, sir, I think it is a little difficult to put a time limit to this, but the die will be cast within the next decade.

Senator SYMINGTON. Within the next decade?

Dr. VON BRAUN. Yes.

Senator SYMINGTON. Thank you, Mr. Chairman. My time is up.

Senator JOHNSON. Thank you, Senator Symington.

Mr. Case of South Dakota.

Senator CASE of South Dakota. Thank you, Mr. Chairman.

Dr. von Braun, I join in expressing appreciation that has already been expressed by the chairman and by the Senator from Missouri and by other Senators for the work that you have done, and particularly for some of the achievements that have been accomplished in the last year.

After the time I spent down in Huntsville with you and General Medaris, I came back to predict that within the early months of 1958 we would have more than one rocket in orbit, and I was pleased when that took place; and I know something of the contribution you made to that.

With respect to this 1½-million-pound thrust booster, are there any problems created for that by the fact that you are operating through ABMA?

Dr. VON BRAUN. No. We have received this task from ARPA in the form of a work assignment, and they also assigned the funds. From there on the whole thing has been solely in the hands of General Medaris, who is my boss and ARPA's agent for this project. It works as smoothly as all our other projects.

Senator CASE of South Dakota. You heard the testimony of Mr. Johnson here earlier today?

Dr. VON BRAUN. Yes, sir.

Senator CASE of South Dakota. Asking about an assignment of ABMA to his agency?

Dr. VON BRAUN. Yes, sir.

Senator CASE of South Dakota. As far as you are aware, then, there has been no handicap to the program under which you are, by reason of the fact that you are with the Army?

Dr. VON BRAUN. No, sir; not at all.

LUNIK THRUST BETWEEN 700,000 AND 800,000 POUNDS

Senator CASE of South Dakota. What did you estimate the thrust behind Lunik to be in terms of pounds?

Dr. VON BRAUN. My estimate is between 700,000 and 800,000 pounds, which is about one-half of what our new booster will have, and approximately twice what the Atlas has.

Senator CASE of South Dakota. Turning to a slightly different matter: Within the past year, has ABMA worked at all on reducing the countdown time and improving the mobility of the IRBM's?

PROBLEM OF MAKING RESPONSE TIME COMPATIBLE WITH MOBILITY

Dr. VON BRAUN. Yes, sir. When the employment of the Jupiter IRBM was handed to the Air Force, we, of course, had to be responsive to the Air Force requirements. Their most stringent requirement for us was a very short readiness time.

In other words, within a very short time span it was necessary to fuel the Jupiter missile, load liquid oxygen in the missile, lay the guidance system, and fire. The time allotted for all this was in the order of the "scramble" time customary for jet bombers. Actually the same rules were directly applied.

Now, to make this quick response time compatible with the inherent mobility of the Jupiter ground system—the mobile concept stems from the time when the Jupiter was still an Army system, was of course not quite simple. At first, it looked like it could not be done at all, and of course it still is not possible to truck a Jupiter missile across the countryside and then have it ready within a matter of minutes to fire.

But after the missile and its attendant ground equipment has been moved into an unprepared firing site we can proceed with the firing preparations up to the moment of fueling the missile. Under this condition the Jupiter system can stand by, ready on "alert" condition, so to speak, and in this condition it can respond very quickly. This has successfully and repeatedly been demonstrated, and the Air Force has accepted the Jupiter missile system on the basis of this demonstrated response time.

The result is that the Jupiter system today is not completely mobile, but it is movable in the sense that you can pull out of one launching site in the evening and be ready to fire from another one the next morning. No fixed installations are necessary, no concrete need to be poured, and no permanent real estate needs to be acquired for the launching sites.

Senator CASE of South Dakota. After you have moved, are you in a position to give the present countdown time from the time the signal was given, or is that classified?

Dr. VON BRAUN. I would have to check whether that is classified information. It can be determined right here.

Senator CASE of South Dakota. Or supply that for the record if you will.

Dr. VON BRAUN. All right.

(The above information was determined to be classified.)

Senator CASE of South Dakota. Dr. von Braun, have you given any consideration to the values of the satellite, if you get enough thrust to get one to be up there where you want it, for getting weather information that would perhaps lead to valuable information in weather forecasting and weather control?

Dr. VON BRAUN. Yes, sir. Such a weather satellite system is under active development, I believe, under ARPA sponsorship.

WEATHER SATELLITE PROGRAM IMPORTANT AND PRACTICAL

Senator CASE of South Dakota. And do you regard that as a practical program?

Dr. VON BRAUN. A very practical program.

Senator CASE of South Dakota. A very important one?

Dr. VON BRAUN. Yes, sir.

Senator CASE of South Dakota. Is that moving along as rapidly as it might, in your judgment?

Dr. VON BRAUN. To my knowledge, yes, sir.

Senator CASE of South Dakota. Thank you, Mr. Chairman.

Senator STENNIS. Senator Martin?

Senator MARTIN. Dr. von Braun, on the estimates of time that you gave to Senator Symington with reference to the ballistic missile, did they refer to estimates of time to catch up with Russia in ballistic missiles?

Dr. VON BRAUN. Yes, sir.

Senator MARTIN. That is all.

Dr. VON BRAUN. To make this point quite clear, I never meant to say that if the Russians stopped work today it would take us 5 years to catch up with their state of technology; but I think even with the utmost effort that we could put into this, it would take us 5 years to catch up with them, always assuming that they will continue their efforts at their present rate.

In other words, we are behind them, and we have to drive faster than they if we are to catch up with them, and this will take at least 5 years.

Senator STENNIS. Senator Case of New Jersey?

Senator CASE of New Jersey. No questions.

Senator STENNIS. Counsel, do you have anything further?

Mr. WEISL. Just one or two questions.

Senator STENNIS. Excuse me just a minute.

Senator Cannon?

Senator CANNON. Doctor, under the present program that we have planned, in your opinion would we catch up with Russia in 5 years, based on this year's budget planning?

Dr. VON BRAUN. I think in the space area it will require more money to catch up.

I mentioned the $40 million and the $100 million in fiscal 1959 and 1960 that we could use to greater advantage, in our big booster development, and I am certain that there are other areas in the space

effort outside of ABMA where more money would also speed things up.

So I think to catch up with the Russians in the space effort, a substantial increase in funds, both for ARPA and for NASA would be the most important single contribution that could be made. Such fund increases would be absolutely necessary to catch up with Russia.

Senator CANNON. So that your 5-year estimate was based on an expanded program rather than on a limited program, as indicated by this present budget.

Dr. VON BRAUN. My feeling is the 5-year estimate is based on the assumption that we are really working as fast as we can, which we are not at this moment, in the space area.

Senator CANNON. Thank you very much, Doctor.

Senator STENNIS. Doctor, we have had testimony here now that ties in with your statement which you have just made specifically with reference to the Atlas missile, and the rate of step-up in that production.

I am sure you were thinking in part of the ICBM's when you made your estimate there of 5 years even at an accelerated program. So what is your estimate now of the situation as to the Atlas?

WE COULD BUILD MORE MISSILES BY GREATER SPENDING

Dr. VON BRAUN. Senator Stennis, let me again clarify my statements. None of my remarks referred to the question of numbers of missiles that we have and that the Russians have. I do not know how many ICBM's or IRBM's the Russians have, and I do not know how many we really need to break even in overall military posture.

All my references were made with regard to the state of development both in the space and the ICBM and IRBM areas. There is no question whatsoever that more Atlases or more Jupiters or more Thors could be built if more money was thrown into the production effort.

Senator STENNIS. I think your overall estimate is very good indeed on the 5 years. But if you did have something specific to say on the Atlas question, which is the most immediate matter, that is something in being at least and can be stepped up with not such a huge time element; would you say something on that? Are you prepared to say something definite on the speed of production there?

Dr. VON BRAUN. Sir, I think the Atlas has demonstrated its basic soundness. It is now in you might call the development cleanup phase.

There are still a few little deficiencies here and there. The reliability must still be increased, but the basic soundness of the concept and the design has been demonstrated. For that reason there would be no reason in the world why you could not increase the production rate, if this is desired and considered important in the interest of the defense of this country and the balance of power.

I do not believe that the cleaning-up process—the remaining development work, on the Atlas—could be speeded up substantially beyond its present rate. I think they are moving about as fast as they can in this area.

Senator STENNIS. Assuming that cleanup continues, there could well be an increase in the production output.

Dr. VON BRAUN. Yes, sir; one could decide right now to produce more Atlases. With the approval of more Atlases, the procurement agencies could immediately start buying more long-leadtime items and, by the time these items hit the assembly line, the cleanup process will probably be finished, anyway.

Senator STENNIS. All right. I think you have covered it.

Counsel?

Mr. WEISL. Dr. von Braun, there has been so much talk about secrecy and classified information and how many intermediate missiles the Russians have, and so forth, that I thought I would call your attention to a document put out by the Library of Congress in September 1958, by Charles H. Donnelly, senior specialist in National Defense. The article in question is headed, "Soviet Operational or Near-Operational Missiles":

> The following table has been prepared from unofficial sources to give an idea of the types of missiles which are believed to be operational or about to become operational in the Soviet Union. In addition to these, the Soviets are known to be developing and testing many others.

Then they give a list of about 25 missiles with a range of from 5 to 5,000 miles, and they include in that table a 12,000-mile skip-glide bomber which, it is said, was flight-tested. That is in the Library of Congress documents that anybody can see.

Dr. VON BRAUN. Sir, I do not know that particular document, but, by and large, I think our national intelligence system is so organized that all the many inputs of intelligence are all brought together so that evaluators are confronted with——

Mr. WEISL. Dr. von Braun, the point I make is that this is available to anybody.

Dr. VON BRAUN. Yes, but this does not necessarily mean that it is true.

Mr. WEISL. I understand so. But at least it is of sufficient credibility that the Library of Congress would publish it.

RELIANCE ON OUR NATIONAL INTELLIGENCE

Dr. VON BRAUN. Sir, I think to endorse or deny the credibility of any such documents is a little difficult. There is an established channel by which national intelligence is appraised by competent professional people, and that is about as efficient a process as one can hope to design in this area. There may still be errors in the conclusions, but it is at least a process to arrive at the best considered judgment of a substantial number of experts in the intelligence field.

Mr. WEISL. I understand that. Dr. von Braun, I want to clear up another situation.

When you speak of needing $40 million and not getting it, it does not mean that when you do not get it, that the money will not eventually be spent, because, in order to build this type engine, you have got to spend that money eventually, and what you were saying was that if you got the money now, you could finish the engine quicker and perhaps in the long run cheaper.

Dr. VON BRAUN. Yes.

Mr. WEISL. So that by giving you the money now, the $40 million now, the Government may be saving money.

Dr. VON BRAUN. That is correct.

Mr. WEISL. Instead of spending more money.

Dr. VON BRAUN. That is correct. But the question of whether we can get those $40 million for fiscal year 1959 and the additional $100 million for fiscal year 1960 will depend on Mr. Johnson's getting the supplementary funds he has requested.

Mr. WEISL. Those were all the questions.

Senator JOHNSON. There are no further questions.

We are closing 2 days of hearings into the Nation's defense and space programs. The testimony so far has established the framework for our further inquiry.

As announced at the beginning of the hearings, we are trying to get an honest count on where we stand in terms of preparedness, and its place in space exploration. To achieve that goal we are going to have to explore information which responsible witnesses have assured us in classified. It seems to me that our hearings so far have developed the following points:

First, the Joint Chiefs of Staff have told us separately and collectively that the budget was adequate, but that each one had reservations. In effect, they checked the question of adequacy back to the Secretary of Defense, who made his decisions on the basis of considerations which the Staff Chiefs considered broader than their own responsibility.

Second, the Secretary of Defense told us in effect that some of the key considerations that he took into account could be discussed only in an executive session.

At this point, we have no way of knowing whether his reasons for cutting the budget request of the Joint Chiefs of Staff were good reasons or bad reasons, and we will have to determine that after the executive session.

Third, our outstanding officials in the field of outer space have told us that our space program is still in its infancy. The sum of their testimony is that the Soviet Union is ahead of us in ability to put heavy objects into space.

In trying to determine whether our defense program is adequate, of course, this committee will have to examine the best available information as to the aggressive forces that might be thrown against us. This will constitute the next phase of the committee's inquiry.

We hope to plan a meeting for some day the middle of next week, and I will inform the members as early as possible.

Dr. von Braun, we are grateful to you for coming here. Do you have any other suggestions that you would care to make to the committee?

Dr. VON BRAUN. No; thank you, sir.

Senator JOHNSON. If not, the committee stands adjourned.

(Whereupon, at 5:35 p.m., the committee recessed, to reconvene subject to the call of the Chair.)

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